

# SEQUENCE LISTING

<110>	Raymond J. Dattwyler Gerald Seinost Daniel Dykhuizen Benjamin J. Luft Maria J.C. Gomes-Solecki	
<120>	Groups of Borrelia Burgdorferi and Borrelia Afzelii That Cause Lyme Disease In Humans	
<130>	2631.1002-001	
	09/596,746 2000-06-19	
	60/140,042 1999-06-18	
<160>	86	
<170>	FastSEQ for Windows Version 4.0	
<210> <211> <212> <213>	24	
<220> <223>	Primer	
<400> aaagaa	1 ataca ttaagtgcga tatt	24
<212>	27	
<220> <223>	Primer	
<400> caatco	2 cactt aatttttgtg ttattag	27
<210> <211> <212> <213>	26	
<220> <223>	Primer	
<400> ttgtta	3 agcag gagcttatgc aatatc	26

<210> 4 <211> 22 <212> DNA <213> Artificial Sequence	
<220> <223> Primer	
<400> 4 gggcttgtaa gctctttaac tg	22
<210> 5 <211> 573 <212> DNA <213> borrelia burgdorferi	
<220> <221> CDS <222> (1)(573)	
<400> 5 atg gct tgt aat aat tca ggg aaa gat ggg aat aca tct gca aat tct Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser 1 5 10 15	48
gct gat gag tct gtt aaa ggg cct aat ctt aca gaa ata agt aaa aaa Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys 20 25 30	96
att acg gat tct aat gcg gtt tta ctt gct gtg aaa gag gtt gaa gcg Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala 35 40 45	144
ttg ctg tca tct ata gat gag ctt gct aaa gct att ggt aaa aaa ata Leu Leu Ser Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile 50 55 60	192
aaa aac gat ggt agt tta gat aat gaa gca aat cgc aac gag tca ttg Lys Asn Asp Gly Ser Leu Asp Asn Glu Ala Asn Arg Asn Glu Ser Leu 65 70 75 80	240
tta gca gga gct tat aca ata tca acc tta ata aca caa aaa tta agt Leu Ala Gly Ala Tyr Thr Ile Ser Thr Leu Ile Thr Gln Lys Leu Ser 85 90 95	288
aaa tta aac gga tca gaa ggt tta aag gaa aag att gcc gca gct aag Lys Leu Asn Gly Ser Glu Gly Leu Lys Glu Lys Ile Ala Ala Ala Lys 100 105 110	336
aaa tgc tct gaa gag ttt agt act aaa cta aaa gat aat cat gca cag Lys Cys Ser Glu Glu Phe Ser Thr Lys Leu Lys Asp Asn His Ala Gln 115 120 125	384

```
ctt ggt ata cag ggc gtt act gat gaa aat gca aaa aaa gct att tta
                                                                   432
Leu Gly Ile Gln Gly Val Thr Asp Glu Asn Ala Lys Lys Ala Ile Leu
   130
                        135
aaa gca aat gca gcg ggt aaa gat aag ggc gtt gaa gaa ctt gaa aag
                                                                   480
Lys Ala Asn Ala Ala Gly Lys Asp Lys Gly Val Glu Glu Leu Glu Lys
                    150
                                                                   528
ttg tcc gga tca tta gaa agc tta tca aaa gca gct aaa gag atg ctt
Leu Ser Gly Ser Leu Glu Ser Leu Ser Lys Ala Ala Lys Glu Met Leu
                165
                                    170
                                                                   573
gct aat tca gtt aaa gag ctt aca agc cct gtt gtc cat gga tcc
Ala Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val His Gly Ser
            180
                                185
<210> 6
<211> 191
<212> PRT
<213> borrelia burgdorferi
<400> 6
Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser
                                    10
Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys
Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala
                            40
Leu Leu Ser Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile
                        55
Lys Asn Asp Gly Ser Leu Asp Asn Glu Ala Asn Arg Asn Glu Ser Leu
                    70
                                        75
Leu Ala Gly Ala Tyr Thr Ile Ser Thr Leu Ile Thr Gln Lys Leu Ser
                                    90
Lys Leu Asn Gly Ser Glu Gly Leu Lys Glu Lys Ile Ala Ala Ala Lys
            100
                                105
Lys Cys Ser Glu Glu Phe Ser Thr Lys Leu Lys Asp Asn His Ala Gln
                            120
Leu Gly Ile Gln Gly Val Thr Asp Glu Asn Ala Lys Lys Ala Ile Leu
                                            140
                        135
Lys Ala Asn Ala Ala Gly Lys Asp Lys Gly Val Glu Glu Leu Glu Lys
                                        155
                    150
Leu Ser Gly Ser Leu Glu Ser Leu Ser Lys Ala Ala Lys Glu Met Leu
                165
                                    170
Ala Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val His Gly Ser
            180
                                185
<210> 7
<211> 557
<212> DNA
<213> Borrelia burgdorferi
<220>
<221> CDS
<222> (3)...(557)
```

	gct													aat Asn 15		48
gct				gtt					ctt					aaa Lys		96
														gag Glu		144
														aaa Lys		192
ata Ile 65	ggc Gly	aat Asn	aat Asn	ggt Gly	tta Leu 70	gag Glu	gcc Ala	aat Asn	cag Gln	agt Ser 75	aaa Lys	aac Asn	aca Thr	tca Ser	ttg Leu 80	240
														tta Leu 95		288
gta Val	ttg Leu	aaa Lys	aat Asn 100	gaa Glu	gaa Glu	tta Leu	aag Lys	gaa Glu 105	aag Lys	att Ile	gat Asp	aca Thr	gct Ala 110	aag Lys	caa Gln	336
tgt Cys	tct Ser	aca Thr 115	gaa Glu	ttt Phe	act Thr	aat Asn	aaa Lys 120	cta Leu	aaa Lys	agt Ser	gaa Glu	cat His 125	gca Ala	gtg Val	ctt Leu	384
ggt Gly	ctg Leu 130	gac Asp	aat Asn	ctt Leu	act Thr	gat Asp 135	gat Asp	aat Asn	gca Ala	caa Gln	aga Arg 140	gct Ala	att Ile	tta Leu	aaa Lys	432
aaa Lys 145	cat His	gca Ala	aat Asn	aaa Lys	gat Asp 150	aag Lys	ggt Gly	gct Ala	gca Ala	gaa Glu 155	ctt Leu	gaa Glu	aag Lys	tta Leu	ttt Phe 160	480
aaa Lys	gcg Ala	gta Val	gaa Glu	aac Asn 165	tta Leu	tca Ser	aaa Lys	gca Ala	gct Ala 170	caa Gln	gac Asp	aca Thr	tta Leu	aaa Lys 175	aat Asn	528
		aaa Lys							gt							557

```
<210> 8
<211> 185
<212> PRT
<213> Borrelia burgdorferi
<400> 8
Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Ala Ser Ala Asn Ser
Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys
Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu Thr
                            40
Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys
Ile Gly Asn Asn Gly Leu Glu Ala Asn Gln Ser Lys Asn Thr Ser Leu
Leu Ser Gly Ala Tyr Ala Ile Ser Asp Leu Ile Ala Glu Lys Leu Asn
Val Leu Lys Asn Glu Glu Leu Lys Glu Lys Ile Asp Thr Ala Lys Gln
                                105
            100
Cys Ser Thr Glu Phe Thr Asn Lys Leu Lys Ser Glu His Ala Val Leu
                            120
Gly Leu Asp Asn Leu Thr Asp Asp Asn Ala Gln Arg Ala Ile Leu Lys
                        135
                                            140
Lys His Ala Asn Lys Asp Lys Gly Ala Ala Glu Leu Glu Lys Leu Phe
                                        155
                    150
Lys Ala Val Glu Asn Leu Ser Lys Ala Ala Gln Asp Thr Leu Lys Asn
                                    170
                165
Ala Val Lys Glu Leu Thr Ser Pro Ile
            180
                                185
<210> 9
<211> 579
<212> DNA
<213> Borrelia burgdorferi
<220>
<221> CDS
<222> (1)...(579)
<400> 9
atq act tta ttt tta ttt ata tct tqt aat aat tca ggg aaa gat ggg
                                                                   48
Met Thr Leu Phe Leu Phe Ile Ser Cys Asn Asn Ser Gly Lys Asp Gly
                                                                   96
aat aca tot goa aat tot got gat gag tot gtt aaa ggg cot aat ott
Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu
             20
aca gaa ata agt aaa aaa att acg gat tct aat gcg gtt tta ctt gct
                                                                   144
Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu Leu Ala
         35
                             40
gtg aaa gag gtt gaa gcg ttg ctg tca tct ata gat gaa att gct gct
                                                                   192
Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Ile Ala Ala
     50
                         55
```

				aaa Lys												240
				gga Gly 85												288
				aaa Lys												336
				gct Ala												384
				aca Thr												432
gca Ala 145	aaa Lys	gaa Glu	gcc Ala	att Ile	tta Leu 150	aaa Lys	aca Thr	aat Asn	ggt Gly	act Thr 155	aaa Lys	act Thr	aaa Lys	ggt Gly	gct Ala 160	480
				aaa Lys 165												528
				ctt Leu												576
gtg Val																579
<211 <212	0> 10 L> 19 2> PE 3> Bo	93 RT	lia 1	ourge	dorfe	eri										
	)> 10															
Met 1	Thr	Leu	Phe	Leu 5	Phe	Ile	Ser	Cys	Asn 10	Asn	Ser	Gly	Lys	Asp 15	СТУ	
Asn	Thr	Ser	Ala 20	Asn	Ser	Ala	Asp	Glu 25	Ser	Val	Lys	Gly	Pro 30	Asn	Leu	
Thr	Glu	Ile 35	Ser	Lys	Lys	Ile	Thr 40	Asp	Ser	Asn	Ala	Val 45	Leu	Leu	Ala	
Val	Lys 50	Glu	Val	Glu	Ala	Leu 55	Leu	Ser	Ser	Ile	Asp 60	Glu	Ile	Ala	Ala	
Lys 65		Ile	Gly	Lys	Lys 70		His	Gln	Asn	Asn 75	Gly	Leu	Asp	Thr	Glu 80	
	Asn	His	Asn	Gly 85		Leu	Leu	Ala	Gly 90		Tyr	Ala	Ile	Ser 95		
Leu	Ile	Lys	Gln 100	Lys	Leu	Asp	Gly	Leu 105		Asn	Glu	Gly	Leu 110		Glu	
Lys	Ile	Asp 115		Ala	Lys	Lys	Cys 120		Glu	Thr	Phe	Thr 125		Lys	Leu	

Lys	Glu 130	Lys	His	Thr	Asp	Leu 135	Gly	Lys	Glu	Gly	Val 140	Thr	Asp	Ala	Asp	
Ala 145		Glu	Ala	Ile	Leu 150		Thr	Asn	Gly	Thr 155		Thr	Lys	Gly	Ala 160	
	Glu	Leu	Gly	Lys 165	Leu	Phe	Glu	Ser	Val 170		Val	Leu	Ser	Lys 175		
Ala	Lys	Glu	Met 180		Ala	Asn	Ser	Val 185	-	Glu	Leu	Thr	Ser 190		Val	
Val			100					100					100			
<211 <212	)> 11 L> 58 2> DN 3> Bo	32 NA	lia k	orgdo	orfei	:i										
	l> CI		. (582	2)												
atg	)> 11 act	tta	ttt	tta	ttt	ata	tct	tgt	aat	aat	tca	ggg	aaa	gat	ggg	48
Met 1	Thr	Leu	Pne	Leu 5	Phe	шe	ser	Cys	10	ASII	ser	GIY	пуѕ	15	GIĀ	
aat Asn	aca Thr	tct Ser	Ala	aat Asn	tct Ser	gct Ala	gat Asp	Glu	tct Ser	gtt Val	aaa Lys	ggg Gly	Pro	aat Asn	ctt Leu	96
			20					25					30			7.4.4
aca Thr	gaa Glu	ata Ile 35	agt Ser	aaa Lys	aaa Lys	att Ile	acg Thr 40	gat Asp	Ser	aat Asn	gcg Ala	Val 45	Leu	Leu	gct Ala	144
gtg Val	aaa Lys 50	gag Glu	gtt Val	gaa Glu	gcg Ala	ttg Leu 55	ctg Leu	tca Ser	tct Ser	ata Ile	gat Asp 60	gag Glu	ctt Leu	gct Ala	aaa Lys	192
gct Ala 65	att Ile	ggt Gly	aaa Lys	aaa Lys	ata Ile 70	aaa Lys	aac Asn	gat Asp	ggt Gly	agt Ser 75	tta Leu	gat Asp	aat Asn	gaa Glu	gca Ala 80	240
aat Asn	cgc Arg	aac Asn	gag Glu	tca Ser 85	ttg Leu	tta Leu	gca Ala	gga Gly	gct Ala 90	tat Tyr	aca Thr	ata Ile	tca Ser	acc Thr 95	tta Leu	288
ata Ile	aca Thr	caa Gln	aaa Lys 100	tta Leu	agt Ser	aaa Lys	tta Leu	aac Asn 105	gga Gly	tca Ser	gaa Glu	ggt Gly	tta Leu 110	aag Lys	gaa Glu	336
aag Lys	att Ile	gcc Ala 115	gca Ala	gct Ala	aag Lys	aaa Lys	tgc Cys 120	tct Ser	gaa Glu	gag Glu	ttt Phe	agt Ser 125	act Thr	aaa Lys	cta Leu	384
aaa Lys	gat Asp 130	aat Asn	cat His	gca Ala	cag Gln	ctt Leu 135	ggt Gly	ata Ile	cag Gln	ggc Gly	gtt Val 140	act Thr	gat Asp	gaa Glu	aat Asn	432

gca aaa aaa gct Ala Lys Lys Ala 145						480
gtt gaa gaa ctt Val Glu Glu Leu						528
gca gct aaa gag Ala Ala Lys Glu 180	Met Leu A.					576
gtt gtg Val Val						582
<210> 12 <211> 194 <212> PRT <213> Borrelia	brgdorferi					
<400> 12 Met Thr Leu Phe	Leu Phe II	le Ser Cys	Asn Asn S	Ser Gly Lys	Asp Gly	
1 Asn Thr Ser Ala	5 Asn Ser Al	la Asp Glu	10 Ser Val L	Lys Gly Pro	15 Asn Leu	
20 Thr Glu Ile Ser		25		30		
35 Val Lys Glu Val	Glu Ala Le	40 eu Leu Ser	Ser Ile A	45 Asp Glu Leu	Ala Lys	
50 Ala Ile Gly Lys	55	5	6	50		
65 Asn Arg Asn Glu	70		75		80	
-	85	_	90		95	
Ile Thr Gln Lys		105	_	110		
Lys Ile Ala Ala 115		120		125		
Lys Asp Asn His		eu Gly Ile 35		/al Thr Asp L40	Glu Asn	
Ala Lys Lys Ala 145		ys Ala Asn	Ala Ala G	Gly Lys Asp	Lys Gly 160	
Val Glu Glu Leu				Glu Ser Leu		
Ala Ala Lys Glu 180	Met Leu A	la Asn Ser 185		Glu Leu Thr 190		
Val Val		165		190		
<210> 13 <211> 576 <212> DNA <213> Borrelia	burgdorfer	i				
<220> <221> CDS <222> (1)(57	6)					

< 40	)> 13	3														
														gat Asp 15		48
														aat Asn		96
														ctg Leu		144
														gct Ala		192
														aat Asn		240
														gac Asp 95		288
														gaa Glu		336
														cta Leu		384
														aat Asn		432
														gct Ala		480
gaa Glu	ctt Leu	gaa Glu	aag Lys	tta Leu 165	ttt Phe	aaa Lys	gcg Ala	gta Val	gaa Glu 170	aac Asn	tta Leu	tca Ser	aaa Lys	gca Ala 175	gct Ala	528
														att Ile		576

```
<210> 14
<211> 192
<212> PRT
<213> Borrelia burgdorferi
<400> 14
Met Thr Leu Phe Leu Phe Ile Ser Cys Asn Asn Ser Gly Lys Asp Gly
Asn Ala Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu
            20
Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala
                            40
Val Lys Glu Val Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr
                        55
Lys Ala Ile Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala Asn Gln
                    70
                                        75
Ser Lys Asn Thr Ser Leu Leu Ser Gly Ala Tyr Ala Ile Ser Asp Leu
                85
                                    90
Ile Ala Glu Lys Leu Asn Val Leu Lys Asn Glu Glu Leu Lys Glu Lys
           100
                                105
                                                    110
Ile Asp Thr Ala Lys Gln Cys Ser Thr Glu Phe Thr Asn Lys Leu Lys
       115
                           120
                                                125
Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp Asn Ala
                        135
                                            140
Gln Arg Ala Ile Leu Lys Lys His Ala Asn Lys Asp Lys Gly Ala Ala
                    150
                                       155
Glu Leu Glu Lys Leu Phe Lys Ala Val Glu Asn Leu Ser Lys Ala Ala
                                   170
               165
                                                       175
Gln Asp Thr Leu Lys Asn Ala Val Lys Glu Leu Thr Ser Pro Ile Val
                                185
<210> 15
<211> 576
<212> DNA
<213> borrelia burgdorferi
<220>
<221> CDS
<222> (1) ... (576)
atg act tta ttt tta ttt ata tct tgt aat aat tca aga aaa gat ggg
                                                                   48
Met Thr Leu Phe Leu Phe Ile Ser Cys Asn Asn Ser Arg Lys Asp Gly
aat gca tct aca aat tct gcc gat gag tct gtt aaa ggg cct aat ctt
                                                                   96
Asn Ala Ser Thr Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu
                                 25
aca gaa ata agt aaa aaa att aca gaa tct aac gca gtt gtt ctg gcc
Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala
                             40
qtq aaa qaa qtt qaq acc tta ctt qca tct ata qat gaa ctt qct acc
Val Lys Glu Val Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr
```

aaa Lys 65																240
agt Ser																288
ata Ile																336
att Ile																384
agt Ser																432
caa Gln 145																480
gaa Glu																528
caa Gln																576
<210 <211 <212 <213	> 19 > PF	92 RT	lia k	ourgo	dorfe	eri										
<400 Met			Phe	Leu	Phe	Ile	Ser	Cvs	Asn	Asn	Ser	Arg	Lvs	Asp	Gly	
1 Asn				5				_	10			_		15		
Thr		Ile	20				Thr	25				Val	30			
Val		35 Glu	Val	Glu	Thr	Leu 55	40 Leu	Ala	Ser	Ile	Asp 60	45 Glu	Leu	Ala	Thr	
Lys 65	50 Ala	Ile	Gly	Lys	Lys 70		Gly	Asn	Asn	Gly 75		Glu	Ala	Asn	Gln 80	
Ser	Lys	Asn	Thr	Ser 85		Leu	Ser	Gly	Ala 90	-	Ala	Ile	Ser	Asp 95		
Ile	Ala	Glu	Lys 100		Asn	Val	Leu	Lys 105	Asn	Glu	Glu	Leu	Lys 110		Lys	
Ile	Asp	Thr 115	Ala	Lys	Gln	Cys	Ser 120	Thr	Glu	Phe	Thr	Asn 125	Lys	Leu	Lys	
														Asn		

Gln Arg A 145	la Ile Le	ı Lys Lys 150	His Ala	Asn Lys 155	Asp Lys	Gly Ala	Ala 160
Glu Leu G	lu Lys Le 16	_	Ala Val	Glu Asn 170	Leu Ser	Lys Ala 175	
Gln Asp T	nr Leu Ly 180	s Asn Ala	Val Lys 185		Thr Ser	Pro Ile 190	Val
<210> 17 <211> 573 <212> DNA <213> Bor	relia bur	gdorferi					
<220> <221> CDS <222> (1)	(573)						
<400> 17							4.0
atg act t Met Thr L 1							Gly
aat aca t Asn Thr S	ct gca aa er Ala As 20	t tct gct n Ser Ala	gat gag Asp Glu 25	Ser Val	aaa ggg Lys Gly	cct aat Pro Asn 30	ctt 96 Leu
aca gaa a Thr Glu I	ta agt aa le Ser Ly 35	a aaa att s Lys Ile	aca gaa Thr Glu 40	tct aac Ser Asn	gca gtt Ala Val 45	gtt ctc Val Leu	gcc 144 Ala
gtg aaa g Val Lys G 50	aa gtt ga lu Val Gl	a act ttg u Thr Leu 55	Leu Thr	tct ata Ser Ile	gat gag Asp Glu 60	ctt gct Leu Ala	aaa 192 Lys
gct att g Ala Ile G 65	gt aaa aa ly Lys Ly	a ata aaa s Ile Lys 70	aac gat Asn Asp	gtt agt Val Ser 75	tta gat Leu Asp	aat gag Asn Glu	gca 240 Ala 80
gat cac a Asp His A	ac gga to sn Gly Se 8	r Leu Ile	tca gga Ser Gly	gca tat Ala Tyr 90	tta att Leu Ile	tca aac Ser Asr 95	Leu
ata aca a Ile Thr L	aa aaa at ys Lys Il 100	a agt gca e Ser Ala	ata aaa Ile Lys 105	Asp Ser	gga gaa Gly Glu	ttg aag Leu Lys 110	gca 336 Ala
gaa att g Glu Ile G 1						Ala Lys	
aaa ggt g Lys Gly G 130			Gly Lys				

```
gca aaa aaa gcc att tta aaa aca aat aat gat aaa act aag ggc gct
                                                                  480
Ala Lys Lys Ala Ile Leu Lys Thr Asn Asn Asp Lys Thr Lys Gly Ala
                   150
gat gaa ctt gaa aag tta ttt gaa tca gta aaa aac ttg tca aaa gca
                                                                  528
Asp Glu Leu Glu Lys Leu Phe Glu Ser Val Lys Asn Leu Ser Lys Ala
                                   170
gct aaa gag atg ctt act aat tca gtt aaa gag ctt aca agc cct
                                                                  573
Ala Lys Glu Met Leu Thr Asn Ser Val Lys Glu Leu Thr Ser Pro
                               185
<210> 18
<211> 191
<212> PRT
<213> Borrelia burgdorferi
<400> 18
Met Thr Leu Phe Leu Phe Ile Ser Cys Asn Asn Ser Gly Lys Asp Gly
                                   10
Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu
           20
Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala
                            40
Val Lys Glu Val Glu Thr Leu Leu Thr Ser Ile Asp Glu Leu Ala Lys
                        55
Ala Ile Gly Lys Lys Ile Lys Asn Asp Val Ser Leu Asp Asn Glu Ala
                   70
Asp His Asn Gly Ser Leu Ile Ser Gly Ala Tyr Leu Ile Ser Asn Leu
               85
                                   90
Ile Thr Lys Lys Ile Ser Ala Ile Lys Asp Ser Gly Glu Leu Lys Ala
           100
                               105
Glu Ile Glu Lys Ala Lys Lys Cys Ser Glu Glu Phe Thr Ala Lys Leu
                                                125
                          120
Lys Gly Glu His Thr Asp Leu Gly Lys Glu Gly Val Thr Asp Asp Asn
                       135
                                           140
Ala Lys Lys Ala Ile Leu Lys Thr Asn Asn Asp Lys Thr Lys Gly Ala
                   150
                                       155
Asp Glu Leu Glu Lys Leu Phe Glu Ser Val Lys Asn Leu Ser Lys Ala
                               170
              165
Ala Lys Glu Met Leu Thr Asn Ser Val Lys Glu Leu Thr Ser Pro
                              185
           180
<210> 19
<211> 553
<212> DNA
<213> Borrelia burgdorferi
<220>
<221> CDS
<222> (1)...(553)
```

< 400	)> 19	9														
					ttt Phe											48
					tct Ser											96
					aaa Lys											144
gtg Val	aaa Lys 50	gaa Glu	att Ile	gaa Glu	act Thr	ttg Leu 55	ctt Leu	gca Ala	tct Ser	ata Ile	gat Asp 60	gaa Glu	ctt Leu	gct Ala	act Thr	192
aaa Lys 65	gct Ala	att Ile	ggt Gly	aaa Lys	aaa Lys 70	ata Ile	gat Asp	aac Asn	aat Asn	gct Ala 75	ggt Gly	ttg Leu	ggt Gly	gct Ala	gaa Glu 80	240
gtg Val	ggt Gly	caa Gln	aac Asn	gga Gly 85	tca Ser	ttg Leu	cta Leu	gca Ala	gga Gly 90	gct Ala	tat Tyr	gca Ala	atc Ile	tca Ser 95	act Thr	288
gta Val	ata Ile	ata Ile	gaa Glu 100	aaa Lys	ttg Leu	agc Ser	aca Thr	tta Leu 105	aaa Lys	aat Asn	gta Val	gaa Glu	gaa Glu 110	tta Leu	aaa Lys	336
gaa Glu	aaa Lys	att Ile 115	aca Thr	aag Lys	gct Ala	aag Lys	gat Asp 120	tgt Cys	tct Ser	gaa Glu	aaa Lys	ttc Phe 125	act Thr	aaa Lys	aaa Lys	384
tta Leu	aaa Lys 130	gat Asp	agc Ser	cgc Arg	gca Ala	gag Glu 135	ctt Leu	ggt Gly	aaa Lys	aaa Lys	gat Asp 140	gcc Ala	agt Ser	gat Asp	gat Asp	432
gat Asp 145	gca Ala	aaa Lys	aaa Lys	gct Ala	att Ile 150	tta Leu	aaa Lys	aca Thr	aat Asn	caa Gln 155	gct Ala	aac Asn	gat Asp	aag Lys	ggt Gly 160	480
gct Ala	aaa Lys	gaa Glu	ctt Leu	aaa Lys 165	gag Glu	tta Leu	ttt Phe	gaa Glu	gca Ala 170	gta Val	gaa Glu	agc Ser	ttg Leu	tca Ser 175	aaa Lys	528
					cta Leu			t								553

```
<210> 20
<211> 184
<212> PRT
<213> Borrelia burgdorferi
<400> 20
Met Thr Leu Phe Leu Phe Ile Ser Cys Asn Asn Ser Gly Lys Asp Gly
Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu
            20
Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala
                            40
Val Lys Glu Ile Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr
Lys Ala Ile Gly Lys Lys Ile Asp Asn Ala Gly Leu Gly Ala Glu
                    70
Val Gly Gln Asn Gly Ser Leu Leu Ala Gly Ala Tyr Ala Ile Ser Thr
                85
                                    90
Val Ile Ile Glu Lys Leu Ser Thr Leu Lys Asn Val Glu Glu Leu Lys
            100
                                105
Glu Lys Ile Thr Lys Ala Lys Asp Cys Ser Glu Lys Phe Thr Lys Lys
                            120
Leu Lys Asp Ser Arg Ala Glu Leu Gly Lys Lys Asp Ala Ser Asp Asp
                        135
Asp Ala Lys Lys Ala Ile Leu Lys Thr Asn Gln Ala Asn Asp Lys Gly
                                       155
                    150
Ala Lys Glu Leu Lys Glu Leu Phe Glu Ala Val Glu Ser Leu Ser Lys
                165
                                    170
Ala Ala Lys Glu Met Leu Asn Lys
            180
<210> 21
<211> 582
<212> DNA
<213> Borrelia burgdorferi
<220>
<221> CDS
<222> (1)...(582)
<400> 21
                                                                   48
atg act tta ttt tta ttt ata tct tgt aat aat tca gga aaa gat ggg
Met Thr Leu Phe Leu Phe Ile Ser Cys Asn Asn Ser Gly Lys Asp Gly
1
                                                                   96
aat aca tot goa aat tot got gat gag tot gtt aaa ggg oot aat ott
Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu
             20
aca gaa ata agt aaa aaa att aca gaa tot aac gca gtt gtt ctg gct
                                                                   144
Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala
         35
```

gtg aaa gaa att Val Lys Glu Ile 50		Leu Ala				
aaa gct att ggt Lys Ala Ile Gly 65						
gcg ggg cat aat Ala Gly His Asn						
cta ata aca caa Leu Ile Thr Gln 100	Lys Leu As					
gaa aaa att gaa Glu Lys Ile Glu 115						
cta gaa gga gaa Leu Glu Gly Glu 130		n Leu Gly				
aat gca aaa aaa Asn Ala Lys Lys 145						
gct gca gag ctt Ala Ala Glu Leu						
gca gct aaa gag Ala Ala Lys Glu 180	Met Leu Al					
att gtg Ile Val						582
<210> 22 <211> 194 <212> PRT <213> Borrelia	burgdorferi					
<400> 22 Met Thr Leu Phe	_	e Ser Cys	Asn Asn	Ser Gly	Lys Asp	Gly
Asn Thr Ser Ala	5 Asn Ser Al	a Asp Glu 25		Lys Gly		Leu
Thr Glu Ile Ser	Lys Lys Il		Ser Asn	Ala Val	-	Ala
Val Lys Glu Ile 50	Glu Thr Le		Ser Ile	_	Leu Ala	Thr
Lys Ala Ile Gly 65		e Gln Gln	Asn Gly 75		Ala Val	Glu 80

Ala	Gly	His	Asn	Gly 85	Thr	Leu	Leu	Ala	Gly 90	Ala	Tyr	Thr	Ile	Ser 95	Lys	
Leu	Ile	Thr	Gln 100	Lys	Leu	Asp	Gly	Leu 105		Asn	Ser	Glu	Lys 110		Lys	
Glu	Lys	Ile 115		Asn	Ala	Lys	Lys 120	Cys	Ser	Glu	Asp	Phe 125	Thr	Lys	Lys	
Leu	Glu 130	Gly	Glu	His	Ala	Gln 135	Leu	Gly	Ile	Glu	Asn 140	Val	Thr	Asp	Glu	
Asn 145		Lys	Lys	Ala	Ile 150		Ile	Thr	Asp	Ala 155	Ala	Lys	Asp	Lys	Gly 160	
	Ala	Glu	Leu	Glu 165		Leu	Phe	Lys	Ala 170		Glu	Asn	Leu	Ala 175	Lys	
Ala	Ala	Lys	Glu 180	Met	Leu	Ala	Asn	Ser 185		Lys	Glu	Leu	Thr 190		Pro	
Ile	Val															
<213 <213	0> 23 1> 11 2> Di 3> Ai	128 NA	icial	l Sec	quenc	ce										
<220 <220		spC (	Chime	era												
	1> CI 2> (1	os 1)	. (112	28)												
	0> 20 act		aat	aat	tca	aaa	aaa	gat	aaa	aat	aca	tct	qca	aat	tct	48
				Asn 5												
gct	gat	gag	tct Ser	gtt Val	aaa Lvs	ggg Gl v	cct	aat Asn	ctt	aca Thr	gaa Glu	ata Tle	agt Ser	aaa Lvs	aaa Lvs	96
AΙα	пор	Olu	20	vai	Lyo	Cly	110	25	200		024		30	-1-	-1-	
att Ile	acg Thr	gat Asp 35	tct Ser	aat Asn	gcg Ala	gtt Val	tta Leu 40	ctt Leu	gct Ala	gtg Val	aaa Lys	gag Glu 45	gtt Val	gaa Glu	gcg Ala	144
								~~+	~~+	222	aat.		aat	222	222	192
Leu	Leu 50	Ser	Ser	ata Ile	Asp	Glu 55	Ile	Ala	Ala	Lys	Ala 60	Ile	Gly	Lys	Lys	172
ata	cac	caa	aat	aat	aat	tta	gat	acc	gaa	tat	aat	cac	aat	ααa	tca	240
Ile 65	His	Gln	Asn	Asn	Gly 70	Leu	Asp	Thr	Glu	Tyr 75	Asn	His	Asn	Ğĺy	Ser 80	
ttg Leu	tta Leu	gcg Ala	gga Gly	gct Ala	tat Tyr	gca Ala	ata Ile	tca Ser	acc Thr	cta Leu	ata Ile	aaa Lys	caa Gln	aaa Lys	tta Leu	288
			-	85	-				90					95		
				aat Asn												336

				aca Thr												384
				ggt Gly												432
				act Thr												480
				gag Glu 165												528
aat Asn	tca Ser	gtt Val	aaa Lys 180	gag Glu	ctt Leu	aca Thr	agc Ser	cct Pro 185	gtt Val	gtg Val	gca Ala	gaa Glu	agt Ser 190	cca Pro	gcc Ala	576
atg Met	gta Val	aat Asn 195	aat Asn	tca Ser	ggg Gly	aaa Lys	gat Asp 200	ggg Gly	aat Asn	aca Thr	tct Ser	gca Ala 205	aat Asn	tct Ser	gct Ala	624
gat Asp	gag Glu 210	tct Ser	gtt Val	aaa Lys	ggg Gly	cct Pro 215	aat Asn	ctt Leu	aca Thr	gaa Glu	ata Ile 220	agt Ser	aaa Lys	aaa Lys	att Ile	672
aca Thr 225	gaa Glu	tct Ser	aac Asn	gca Ala	gtt Val 230	gtt Val	ctc Leu	gcc Ala	gtg Val	aaa Lys 235	gaa Glu	gtt Val	gaa Glu	act Thr	ttg Leu 240	720
ctt Leu	aca Thr	tct Ser	ata Ile	gat Asp 245	gag Glu	ctt Leu	gct Ala	aaa Lys	gct Ala 250	att Ile	ggt Gly	aaa Lys	aaa Lys	ata Ile 255	aaa Lys	768
aac Asn	gat Asp	gtt Val	agt Ser 260	tta Leu	gat Asp	aat Asn	gag Glu	gca Ala 265	gat Asp	cac His	aac Asn	gga Gly	tca Ser 270	tta Leu	ata Ile	816
tca Ser	gga Gly	gca Ala 275	tat Tyr	tta Leu	att Ile	tca Ser	aac Asn 280	tta Leu	ata Ile	aca Thr	aaa Lys	aaa Lys 285	ata Ile	agt Ser	gca Ala	864
ata Ile	aaa Lys 290	gat Asp	tca Ser	gga Gly	gaa Glu	ttg Leu 295	aag Lys	gca Ala	gaa Glu	att Ile	gaa Glu 300	aag Lys	gct Ala	aag Lys	aaa Lys	912
				ttt Phe												960

ggt aaa Gly Lys															1008
aca aat Thr Asn															1056
gaa tca Glu Ser															1104
tca gtt Ser Val 370						taa *									1128
<210> 2 <211> 3 <212> P <213> A	75 RT	lcia:	l Sed	quenc	ce										
<220> <223> 0	spC (	Chime	era												
<400> 2 Met Ala 1		Asn	Asn 5	Ser	Gly	Lys	Asp	Gly 10	Asn	Thr	Ser	Ala	Asn 15	Ser	
Ala Asp	Glu	Ser 20	Val	Lys	Gly	Pro	Asn 25	Leu	Thr	Glu	Ile	Ser 30	Lys	Lys	
Ile Thr	Asp 35		Asn	Ala	Val	Leu 40		Ala	Val	Lys	Glu 45		Glu	Ala	
Leu Leu 50		Ser	Ile	Asp	Glu 55		Ala	Ala	Lys	Ala 60		Gly	Lys	Lys	
Ile His	Gln	Asn	Asn	Gly 70		Asp	Thr	Glu	Tyr 75	Asn	His	Asn	Gly	Ser 80	
Leu Leu	Ala	Gly	Ala 85	Tyr	Ala	Ile	Ser	Thr 90	Leu	Ile	Lys	Gln	Lys 95	Leu	
Asp Gly	Leu	Lys 100	Asn	Glu	Gly	Leu	Lys 105	Glu	Lys	Ile	Asp	Ala 110	Ala	Lys	
Lys Cys	Ser 115	Glu	Thr	Phe	Thr	Asn 120	Lys	Leu	Lys	Glu	Lys 125	His	Thr	Asp	
Leu Gly 130	Lys	Glu	Gly	Val	Thr 135	Asp	Ala	Asp	Ala	Lys 140	Glu	Ala	Ile	Leu	
Lys Thr 145	Asn	Gly	Thr	Lys 150	Thr	Lys	Gly	Ala	Glu 155	Glu	Leu	Gly	Lys	Leu 160	
Phe Glu	Ser	Val	Glu 165	Val	Leu	Ser	Lys	Ala 170	Ala	Lys	Glù	Met	Leu 175	Ala	
Asn Ser	Val	Lys 180		Leu	Thr	Ser	Pro 185	Val	Val	Ala	Glu	Ser 190	Pro	Ala	
Met Val	Asn 195		Ser	Gly	Lys	Asp 200		Asn	Thr	Ser	Ala 205		Ser	Ala	
Asp Glu 210		Val	Lys	Gly	Pro 215		Leu	Thr	Glu	Ile 220		Lys	Lys	Ile	
Thr Glu 225	Ser	Asn	Ala	Val 230		Leu	Ala	Val	Lys 235		Val	Glu	Thr	Leu 240	

Leu	Thr	Ser	Ile	Asp 245	Glu	Leu	Ala	Lys	Ala 250	Ile	Gly	Lys	Lys	Ile 255	Lys	
Asn	Asp	Val	Ser 260	Leu	Asp	Asn	Glu	Ala 265		His	Asn	Gly	Ser 270		Ile	
Ser	Gly	Ala 275	Tyr	Leu	Ile	Ser	Asn 280	Leu	Ile	Thr	Lys	Lys 285	Ile	Ser	Ala	
Ile	Lys 290		Ser	Gly	Glu	Leu 295		Ala	Glu	Ile	Glu 300		Ala	Lys	Lys	
Cys 305		Glu	Glu	Phe	Thr 310		Lys	Leu	Lys	Gly 315		His	Thr	Asp	Leu 320	
	Lys	Glu	Gly	Val 325		Asp	Asp	Asn	Ala 330		Lys	Ala	Ile	Leu 335		
Thr	Asn	Asn	Asp 340	Lys	Thr	Lys	Gly	Ala 345		Glu	Leu	Glu	Lys 350		Phe	
Glu	Ser	Val 355		Asn	Leu	Ser	Lys 360		Ala	Lys	Glu	Met 365		Thr	Asn	
Ser	Val 370		Glu	Leu	Thr	Ser 375	300									
<211 <212	)> 25 .> 11 2> DN 3> An	L 2 4 NA	icial	l Sed	quenc	ce										
<220 <223		spC (	Chime	era												
	L> CI 2> (1	os L)	. (112	24)												
	)> 25															40
atg Met 1	gct Ala	tgt Cys	aat Asn	aat Asn 5	tca Ser	ggg Gly	aaa Lys	gat Asp	ggg Gly 10	aat Asn	aca Thr	tct Ser	gca Ala	aat Asn 15	Ser	48
gct	gat	gag	tct	gtt	aaa	ggg	cct	aat	ctt	aca	gaa	ata	agt	aaa	aaa	96
Ala	Asp	GIU	Ser 20	Val	гуѕ	GIY	Pro	25	ьеu	IIIT	GIU	TIE	30	пуѕ	пуз	
att Ile	acg Thr	gat Asp 35	tct Ser	aat Asn	gcg Ala	gtt Val	tta Leu 40	ctt Leu	gct Ala	gtg Val	aaa Lys	gag Glu 45	gtt Val	gaa Glu	gcg Ala	144
ttg Leu	ctg Leu 50	tca Ser	tct Ser	ata Ile	gat Asp	gaa Glu 55	att Ile	gct Ala	gct Ala	aaa Lys	gct Ala 60	att Ile	ggt Gly	aaa Lys	aaa Lys	192
ata Ile 65	cac His	caa Gln	aat Asn	aat Asn	ggt Gly 70	ttg Leu	gat Asp	acc Thr	gaa Glu	tat Tyr 75	aat Asn	cac His	aat Asn	gga Gly	tca Ser 80	240
ttg Leu	tta Leu	gcg Ala	gga Gly	gct Ala 85	tat Tyr	gca Ala	ata Ile	tca Ser	acc Thr 90	cta Leu	ata Ile	aaa Lys	caa Gln	aaa Lys 95	tta Leu	288
gat	gga	ttg	aaa	aat	gaa	gga	tta	aag	gaa	aaa	att	gat	gcg	gct	aag	336

Asp	Gly	Leu	Lys 100	Asn	Glu	Gly	Leu	Lys 105	Glu	Lys	Ile	Asp	Ala 110	Ala	Lys	
														aca Thr		384
ctt Leu	ggt Gly 130	aaa Lys	gaa Glu	ggt Gly	gtt Val	act Thr 135	gat Asp	gct Ala	gat Asp	gca Ala	aaa Lys 140	gaa Glu	gcc Ala	att Ile	tta Leu	432
aaa Lys 145	aca Thr	aat Asn	ggt Gly	act Thr	aaa Lys 150	act Thr	aaa Lys	ggt Gly	gct Ala	gaa Glu 155	gaa Glu	ctt Leu	gga Gly	aaa Lys	tta Leu 160	480
ttt Phe	gaa Glu	tca Ser	gta Val	gag Glu 165	gtc Val	ttg Leu	tca Ser	aaa Lys	gca Ala 170	gct Ala	aaa Lys	gag Glu	atg Met	ctt Leu 175	gct Ala	528
aat Asn	tca Ser	gtt Val	aaa Lys 180	gag Glu	ctt Leu	aca Thr	agc Ser	cct Pro 185	gtt Val	gtg Val	gca Ala	gaa Glu	agt Ser 190	cca Pro	gcc Ala	576
atg Met	gta Val	aat Asn 195	aat Asn	tca Ser	gga Gly	aaa Lys	gat Asp 200	ggg Gly	aat Asn	aca Thr	tct Ser	gca Ala 205	aat Asn	tct Ser	gct Ala	624
gat Asp	gag Glu 210	tct Ser	gtt Val	aaa Lys	Gly	cct Pro 215	aat Asn	ctt Leu	aca Thr	gaa Glu	ata Ile 220	agt Ser	aaa Lys	aaa Lys	att Ile	672
aca Thr 225	gaa Glu	tct Ser	aac Asn	gca Ala	gtt Val 230	gtt Val	ctg Leu	gct Ala	gtg Val	aaa Lys 235	gaa Glu	att Ile	gaa Glu	act Thr	ttg Leu 240	720
ctt Leu	gca Ala	tct Ser	ata Ile	gat Asp 245	gaa Glu	ctt Leu	gct Ala	act Thr	aaa Lys 250	gct Ala	att Ile	ggt Gly	aaa Lys	aaa Lys 255	ata Ile	768
caa Gln	caa Gln	aat Asn	ggt Gly 260	ggt Gly	tta Leu	gct Ala	gtc Val	gaa Glu 265	gcg Ala	ggg Gly	cat His	aat Asn	gga Gly 270	aca Thr	ttg Leu	816
tta Leu	gca Ala	ggt Gly 275	gct Ala	tat Tyr	aca Thr	ata Ile	tca Ser 280	aaa Lys	cta Leu	ata Ile	aca Thr	caa Gln 285	aaa Lys	tta Leu	gat Asp	864
gga Gly	ttg Leu 290	aaa Lys	aat Asn	tca Ser	gaa Glu	aaa Lys 295	tta Leu	aag Lys	gaa Glu	aaa Lys	att Ile 300	gaa Glu	aat Asn	gct Ala	aag Lys	912
aaa Lys 305	tgt Cys	tct Ser	gaa Glu	gat Asp	ttt Phe 310	act Thr	aaa Lys	aaa Lys	cta Leu	gaa Glu 315	gga Gly	gaa Glu	cat His	gcg Ala	caa Gln 320	960

											aaa Lys					1008
											gag Glu					1056
											aaa Lys					1104
	tca Ser 370				ctt Leu	ac										1124
<211 <212	)> 26 l> 37 2> PF 3> Ar	74 RT	icial	L Sec	quenc	ce										
<220 <223	)> 3> Os	spC (	Chime	era												
	)> 26 Ala		Asn	Asn 5	Ser	Gly	Lys	Asp	Gly 10	Asn	Thr	Ser	Ala	Asn 15	Ser	
	Asp	Glu	Ser 20	-	Lys	Gly	Pro	Asn 25		Thr	Glu	Ile	Ser 30		Lys	
Ile	Thr	Asp 35	Ser	Asn	Ala	Val	Leu 40	Leu	Ala	Val	Lys	Glu 45	Val	Glu	Ala	
Leu	Leu 50	Ser	Ser	Ile	Asp	Glu 55	Ile	Ala	Ala	Lys	Ala 60	Ile	Gly	Lys	Lys	
Ile 65	His	Gln	Asn	Asn	Gly 70	Leu	Asp	Thr	Glu	Tyr 75	Asn	His	Asn	Gly	Ser 80	
Leu	Leu	Ala	Gly	Ala 85	Tyr	Ala	Ile	Ser	Thr 90	Leu	Ile	Lys	Gln	Lys 95	Leu	
Asp	Gly	Leu	Lys 100	Asn	Glu	Gly	Leu	Lys 105	Glu	Lys	Ile	Asp	Ala 110	Ala	Lys	
-	-	115					120	_		-	Glu	125			_	
Leu	Gly 130	Lys	Glu	Gly	Val	Thr 135	Asp	Ala	Asp	Ala	Lys 140	Glu	Ala	Ile	Leu	
Lys 145	Thr	Asn	Gly	Thr	Lys 150	Thr	Lys	Gly	Ala	Glu 155	Glu	Leu	Gly	Lys	Leu 160	
				165				_	170		Lys			175		
			180					185			Ala		190			
		195					200				Ser	205				
_	210			_	_	215					11e 220					
Thr 225	Glu	Ser	Asn	Ala	Val 230	Val	Leu	Ala	Val	Lys 235	Glu	Ile	Glu	Thr	Leu 240	

Leu	Ala	Ser	Ile	Asp 245	Glu	Leu	Ala	Thr	Lys 250	Ala	Ile	Gly	Lys	Lys 255	Ile	
Gln	Gln	Asn	Gly 260	Gly	Leu	Ala	Val	Glu 265		Gly	His	Asn	Gly 270		Leu	
Leu	Ala	Gly 275	Ala	Tyr	Thr	Ile	Ser 280	Lys	Leu	Ile	Thr	Gln 285	Lys	Leu	Asp	
Gly	Leu 290	Lys	Asn	Ser	Glu	Lys 295	Leu	Lys	Glu	Lys	Ile 300	Glu	Asn	Ala	Lys	
Lys 305	Cys	Ser	Glu	Asp	Phe 310	Thr	Lys	Lys	Leu	Glu 315	Gly	Glu	His	Ala	Gln 320	
Leu	Gly	Ile	Glu	Asn 325	Val	Thr	Asp	Glu	Asn 330	Ala	Lys	Lys	Ala	Ile 335	Leu	
Ile	Thr	Asp	Ala 340	Ala	Lys	Asp	Lys	Gly 345	Ala	Ala	Glu	Leu	Glu 350	Lys	Leu	
Phe	Lys	Ala 355	Val	Glu	Asn	Leu	Ala 360	Lys	Ala	Ala	Lys	Glu 365	Met	Leu	Ala	
Asn	Ser 370	Val	Lys	Glu	Leu											
<211 <212	0> 27 l> 11 2> DN 3> An	137 NA	lcial	l Sec	quenc	ce										
<220 <223		spC (	Chime	era												
	L> CI 2> (1	os L)	(113	37)												
<400	)> 21	7														
atg	gct	tgt		aat Asn												48
1		- 4		5		<b>3</b>			10					15		
				gtt Val												96
	_		20		-	_		25					30	_		
				aat Asn												144
				ata												192
Leu	Leu 50	Ser	Ser	Ile	Asp	G1u 55	Ile	Ala	Ala	Lys	60	ile	Gly	Lys	ГАЗ	
				aat Asn												240
65					70					75				- <b>-</b> 1	80	
				gct Ala												288
			· - 4	85	<b>4</b> –				90			<b>.</b>		95	-	

					gaa Glu											336
					ttt Phe											384
					gtt Val											432
					aaa Lys 150											480
ttt Phe	gaa Glu	tca Ser	gta Val	gag Glu 165	gtc Val	ttg Leu	tca Ser	aaa Lys	gca Ala 170	gct Ala	aaa Lys	gag Glu	atg Met	ctt Leu 175	gct Ala	528
aat Asn	tca Ser	gtt Val	aaa Lys 180	gag Glu	ctt Leu	aca Thr	agc Ser	cct Pro 185	gtt Val	gtg Val	gca Ala	gaa Glu	agt Ser 190	cca Pro	aaa Lys	576
aaa Lys	cct Pro	tcc Ser 195	atg Met	gta Val	aat Asn	aat Asn	tca Ser 200	ggg Gly	aaa Lys	gat Asp	ggg Gly	aat Asn 205	aca Thr	tct Ser	gca Ala	624
aat Asn	tct Ser 210	gct Ala	gat Asp	gag Glu	tct Ser	gtt Val 215	aaa Lys	ggg Gly	cct Pro	aat Asn	ctt Leu 220	aca Thr	gaa Glu	ata Ile	agt Ser	672
aaa Lys 225	aaa Lys	att Ile	aca Thr	gaa Glu	tct Ser 230	aac Asn	gca Ala	gtt Val	gtt Val	ctc Leu 235	gcc Ala	gtg Val	aaa Lys	gaa Glu	gtt Val 240	720
gaa Glu	act Thr	ttg Leu	ctt Leu	aca Thr 245	tct Ser	ata Ile	gat Asp	gag Glu	ctt Leu 250	gct Ala	aaa Lys	gct Ala	att Ile	ggt Gly 255	aaa Lys	768
aaa Lys	ata Ile	aaa Lys	aac Asn 260	gat Asp	gtt Val	agt Ser	tta Leu	gat Asp 265	aat Asn	gag Glu	gca Ala	gat Asp	cac His 270	aac Asn	gga Gly	816
					gca Ala											864
ata Ile	agt Ser 290	gca Ala	ata Ile	aaa Lys	gat Asp	tca Ser 295	gga Gly	gaa Glu	ttg Leu	aag Lys	gca Ala 300	gaa Glu	att Ile	gaa Glu	aag Lys	912
gct Ala 305	aag Lys	aaa Lys	tgt Cys	tct Ser	gaa Glu 310	gaa Glu	ttt Phe	act Thr	gct Ala	aaa Lys 315	tta Leu	aaa Lys	ggt Gly	gaa Glu	cac His 320	960

	at ctt sp Leu														1008
	ta aaa eu Lys														1056
	ta ttt eu Phe 355														1104
Leu Th	ct aat hr Asn 70								taa *						1137
<210><211><212><212><213>	378	icia	l Sed	quend	ce										
<220> <223>	OspC	Chime	era												
<400> Met Al	28 la Cys	Asn	Asn 5	Ser	Gly	Lys	Asp	Gly 10	Asn	Thr	Ser	Ala	Asn 15	Ser	
	sp Glu	Ser 20	Val	Lys	Gly	Pro	Asn 25	Leu	Thr	Glu	Ile	Asn 30	Lys	Lys	
Ile T	hr Asp 35	Ser	Asn	Ala	Val	Leu 40	Leu	Ala	Val	Lys	Glu 45	Val	Glu	Ala	
Leu Le	eu Ser	Ser	Ile	Asp	Glu 55		Ala	Ala	Lys	Ala 60		Gly	Lys	Lys	
	is Gln	Asn	Asn	Gly 70		Asp	Thr	Glu	Asn 75		His	Asn	Gly	Ser 80	
	eu Ala	Gly	Ala 85	Tyr	Ala	Ile	Ser	Thr 90	Leu	Ile	Lys	Gln	Lys 95	Leu	
Asp G	ly Leu	Lys 100		Glu	Gly	Leu	Lys 105	Glu	Lys	Ile	Asp	Ala 110	Ala	Lys	
Lys C	ys Ser 115		Thr	Phe	Thr	Asn 120		Leu	Lys	Glu	Lys 125		Thr	Asp	
	ly Lys 30	Glu	Gly	Val	Thr 135		Ala	Asp	Ala	Lys 140		Ala	Ile	Leu	
	la Asn	Gly	Thr	Lys 150		Lys	Gly	Ala	Glu 155		Leu	Gly	Lys	Leu 160	
	lu Ser	Val	Glu 165		Leu	Ser	Lys	Ala 170		Lys	Glu	Met	Leu 175	Ala	
Asn S	er Val	Lys 180		Leu	Thr	Ser	Pro 185		Val	Ala	Glu	Ser 190		Lys	
Lys P	ro Ser 195		Val	Asn	Asn	Ser 200		Lys	Asp	Gly	Asn 205		Ser	Ala	
_	er Ala 10	Asp	Glu	Ser	Val 215		Gly	Pro	Asn	Leu 220		Glu	Ile	Ser	
	ys Ile	Thr	Glu	Ser 230		Ala	Val	Val	Leu 235		Val	Lys	Glu	Val 240	

Glu	Thr	Leu	Leu	Thr 245	Ser	Ile	Asp	Glu	Leu 250	Ala	Lys	Ala	Ile	Gly 255	Lys	
Lys	Ile	Lys	Asn 260		Val	Ser	Leu	Asp 265		Glu	Ala	Asp	His 270		Gly	
Ser	Leu	Ile 275	Ser	Gly	Ala	Tyr	Leu 280		Ser	Asn	Leu	Ile 285	-	Lys	Lys	
Ile	Ser 290	-	Ile	Lys	Asp	Ser 295		Glu	Leu	Lys	Ala 300		Ile	Glu	Lys	
Ala 305		Lys	Cys	Ser	Glu 310		Phe	Thr	Ala	Lys 315		Lys	Gly	Glu	His 320	
	Asp	Leu	Gly	Lys 325	Glu	Gly	Val	Thr	Asp 330		Asn	Ala	Lys	Lys 335		
Ile	Leu	Lys	Thr 340		Asn	Asp	Lys	Thr 345		Gly	Ala	Asp	Glu 350		Glu	
Lys	Leu	Phe 355		Ser	Val	Lys	Asn 360		Ser	Lys	Ala	Ala 365		Glu	Met	
Leu	Thr 370		Ser	Val	Lys	Glu 375		Thr	Ser							
<211 <212	)> 29  > 11  > DN   3> An	.33 IA	icial	L Sec	quenc	ce										
<220 <223		spC (	Chime	era												·
	.> CI ?> (1	)	. (113	33)												
	)> 29															
					tca Ser											48
					aaa Lys											96
					gcg Ala											144
					gat Asp											192
ata Ile 65	cac His	caa Gln	aat Asn	aat Asn	ggt Gly 70	ttg Leu	gat Asp	acc Thr	gaa Glu	aat Asn 75	aat Asn	cac His	aat Asn	gga Gly	tca Ser 80	240
ttg Leu	tta Leu	gcg Ala	gga Gly	gct Ala 85	tat Tyr	gca Ala	ata Ile	tca Ser	acc Thr 90	cta Leu	ata Ile	aaa Lys	caa Gln	aaa Lys 95	tta Leu	288
gat	gga	ttg	aaa	aat	gaa	gga	tta	aag	gaa	aaa	att	gat	gcg	gct	aag	336

Asp	Gly	Leu	Lys 100	Asn	Glu	Gly	Leu	Lys 105	Glu	Lys	Ile	Asp	Ala 110	Ala	Lys	
													cac His			384
													gcc Ala			432
aaa Lys 145	gca Ala	aat Asn	ggt Gly	act Thr	aaa Lys 150	act Thr	aaa Lys	ggt Gly	gct Ala	gaa Glu 155	gaa Glu	ctt Leu	gga Gly	aaa Lys	tta Leu 160	480
ttt Phe	gaa Glu	tca Ser	gta Val	gag Glu 165	gtc Val	ttg Leu	tca Ser	aaa Lys	gca Ala 170	gct Ala	aaa Lys	gag Glu	atg Met	ctt Leu 175	gct Ala	528
													agt Ser 190			576
aaa Lys	cct Pro	tcc Ser 195	atg Met	gta Val	aat Asn	aat Asn	tca Ser 200	gga Gly	aaa Lys	gat Asp	ggg Gly	aat Asn 205	aca Thr	tct Ser	gca Ala	624
aat Asn	tct Ser 210	gct Ala	gat Asp	gag Glu	tct Ser	gtt Val 215	aaa Lys	ggg Gly	cct Pro	aat Asn	ctt Leu 220	aca Thr	gaa Glu	ata Ile	agt Ser	672
aaa Lys 225	aaa Lys	att Ile	aca Thr	gaa Glu	tct Ser 230	aac Asn	gca Ala	gtt Val	gtt Val	ctg Leu 235	gct Ala	gtg Val	aaa Lys	gaa Glu	att Ile 240	720
gaa Glu	act Thr	ttg Leu	ctt Leu	gca Ala 245	tct Ser	ata Ile	gat Asp	gaa Glu	ctt Leu 250	gct Ala	act Thr	aaa Lys	gct Ala	att Ile 255	ggt Gly	768
aaa Lys	aaa Lys	ata Ile	caa Gln 260	caa Gln	aat Asn	ggt Gly	ggt Gly	tta Leu 265	gct Ala	gtc Val	gaa Glu	gcg Ala	ggg Gly 270	cat His	aat Asn	816
gga Gly	aca Thr	ttg Leu 275	tta Leu	gca Ala	ggt Gly	gct Ala	tat Tyr 280	aca Thr	ata Ile	tca Ser	aaa Lys	cta Leu 285	ata Ile	aca Thr	caa Gln	864
													aaa Lys			912
aat Asn 305	gct Ala	aag Lys	aaa Lys	tgt Cys	tct Ser 310	gaa Glu	gat Asp	ttt Phe	act Thr	aaa Lys 315	aaa Lys	cta Leu	gaa Glu	gga Gly	gaa Glu 320	960

cat His	gcg Ala	caa Gln	ctt Leu	gga Gly 325	att Ile	gaa Glu	aat Asn	gtt Val	act Thr 330	gat Asp	gag Glu	aat Asn	gca Ala	aaa Lys 335	aaa Lys	1008
					gat Asp											1056
					gca Ala											1104
					gtt Val				ac							1133
<213 <213 <213 <220	0>	77 RT			quenc	ce										
		-														
Met	0> 3( Ala		Asn	_	Ser	Gly	Lys	Asp	Gly 10	Asn	Thr	Ser	Ala	Asn 15	Ser	
1 Ala	Asp	Glu	Ser 20	5 Val	Lys	Gly	Pro	Asn 25		Thr	Glu	Ile	Asn 30		Lys	
Ile	Thr	Asp 35		Asn	Ala	Val	Leu 40		Ala	Val	Lys	Glu 45		Glu	Ala	
Leu	Leu 50		Ser	Ile	Asp	Glu 55		Ala	Ala	Lys	Ala 60		Gly	Lys	Lys	
Ile 65		Gln	Asn	Asn	Gly 70		Asp	Thr	Glu	Asn 75		His	Asn	Gly	Ser 80	
	Leu	Ala	Gly	Ala 85	Tyr	Ala	Ile	Ser	Thr 90		Ile	Lys	Gln	Lys 95		
Asp	Gly	Leu	Lys		Glu	Gly	Leu	Lys 105		Lys	Ile	Asp	Ala 110		Lys	
Lys	Cys	Ser 115		Thr	Phe	Thr	Asn 120		Leu	Lys	Glu	Lys 125		Thr	Asp	
Leu	Gly 130		Glu	Gly	Val	Thr 135		Ala	Asp	Ala	Lys 140		Ala	Ile	Leu	
Lys 145		Asn	Gly	Thr	Lys 150		Lys	Gly	Ala	Glu 155		Leu	Gly	Lys	Leu 160	
	Glu	Ser	Val	Glu 165	Val	Leu	Ser	Lys	Ala 170		Lys	Glu	Met	Leu 175		
Asn	Ser	Val	Lys 180		Leu	Thr	Ser	Pro 185		Val	Ala	Glu	Ser 190		Lys	
Lys	Pro	Ser 195		Val	Asn	Asn	Ser 200		Lys	Asp	Gly	Asn 205		Ser	Ala	
Asn	Ser 210		Asp	Glu	Ser	Val 215		Gly	Pro	Asn	Leu 220		Glu	Ile	Ser	
Lys 225		Ile	Thr	Glu	Ser 230		Ala	Val	Val	Leu 235		Val	Lys	Glu	Ile 240	

Glu Thr	Leu	Leu	Ala 245	Ser	Ile	Asp	Glu	Leu 250	Ala	Thr	Lys	Ala	Ile 255	Gly	
Lys Lys	Ile	Gln 260		Asn	Gly	Gly	Leu 265		Val	Glu	Ala	Gly 270		Asn	
Gly Thr	Leu 275		Ala	Gly	Ala	Tyr 280		Ile	Ser	Lys	Leu 285		Thr	Gln	
Lys Leu 290		Gly	Leu	Lys	Asn 295		Glu	Lys	Leu	Lys 300		Lys	Ile	Glu	
Asn Ala	Lys	Lys	Cys	Ser 310		Asp	Phe	Thr	Lys 315		Leu	Glu	Gly	Glu 320	
His Ala	Gln	Leu	Gly 325		Glu	Asn	Val	Thr 330		Glu	Asn	Ala	Lys 335		
Ala Ile	Leu	Ile 340		Asp	Ala	Ala	Lys 345		Lys	Gly	Ala	Ala 350		Leu	
Glu Lys	Leu 355		Lys	Ala	Val	Glu 360		Leu	Ala	Lys	Ala 365		Lys	Glu	
Met Leu 370		Asn	Ser	Val	Lys 375		Leu				303				
<210> 31 <211> 11 <212> DN <213> Ar	.12 IA	.cia]	l Sed	quenc	ce										
<220> <223> Os	pC C	Chime	era												
<221> CE															
<222> (1	.)	(111	12)												
<400> 31	-										<b>.</b>		+	<b>+</b> a <b>+</b>	40
	tgt	aat	aat												48
<400> 31 atg gct Met Ala	tgt Cys gag	aat Asn tct	aat Asn 5 gtt	Ser	Gly	Lys	Asp	Gly 10 ctt	Asn	Thr	Ser	Ala	Asn 15 aaa	Ser	48 96
<400> 31 atg gct Met Ala 1 gct gat	tgt Cys gag Glu	aat Asn tct Ser 20	aat Asn 5 gtt Val	Ser aaa Lys gcg	Gly ggg Gly gtt	Lys cct Pro	Asp aat Asn 25 ctt	Gly 10 ctt Leu gct	Asn aca Thr	Thr gaa Glu aaa	Ser ata Ile gag	Ala agt Ser 30 gtt	Asn 15 aaa Lys gaa	ser aaa Lys gcg	
<400> 31 atg gct Met Ala 1 gct gat Ala Asp	tgt Cys gag Glu gat Asp 35	aat Asn tct Ser 20 tct Ser	aat Asn 5 gtt Val aat Asn	Ser aaa Lys gcg Ala	ggg Gly gtt Val	cct Pro tta Leu 40	aat Asn 25 ctt Leu	Gly 10 ctt Leu gct Ala	Asn aca Thr gtg Val gct	Thr gaa Glu aaa Lys att	ser ata Ile gag Glu 45	agt Ser 30 gtt Val	Asn 15 aaa Lys gaa Glu aaa	ser aaa Lys gcg Ala ata	96
<400> 31 atg gct Met Ala 1 gct gat Ala Asp att acg Ile Thr ttg ctg Leu Leu	tgt Cys gag Glu gat Asp 35 tca Ser	aat Asn tct Ser 20 tct Ser tct	aat Asn 5 gtt Val aat Asn ata Ile	ser aaa Lys gcg Ala gat Asp	ggg Gly gtt Val gag Glu 55	cct Pro tta Leu 40 ctt Leu	Asp aat Asn 25 ctt Leu gct Ala	Gly 10 ctt Leu gct Ala aaa Lys	Asn aca Thr gtg Val gct Ala	Thr gaa Glu aaa Lys att Ile 60 cgc	ser ata Ile gag Glu 45 ggt Gly aac	agt Ser 30 gtt Val aaa Lys	Asn 15 aaa Lys gaa Glu aaa Lys	aaa Lys gcg Ala ata Ile	96
<400> 31 atg gct Met Ala 1 gct gat Ala Asp att acg Ile Thr ttg ctg Leu Leu 50 aaa aac Lys Asn	tgt Cys gag Glu gat Asp 35 tca Ser gat	aat Asn tct Ser 20 tct Ser tct Ser ggt Gly	aat Asn 5 gtt Val aat Asn ata Ile agt Ser tat	ser aaa Lys gcg Ala gat Asp tta Leu 70 aca	ggg Gly gtt Val gag Glu 55 gat Asp	cct Pro tta Leu 40 ctt Leu aat Asn	Asp aat Asn 25 ctt Leu gct Ala gaa Glu acc	Gly 10 ctt Leu gct Ala aaa Lys gca Ala tta	Asn aca Thr gtg Val gct Ala aat Asn 75 ata	Thr gaa Glu aaa Lys att Ile 60 cgc Arg	ser ata Ile gag Glu 45 ggt Gly aac Asn caa	agt Ser 30 gtt Val aaa Lys gag Glu	Asn 15 aaa Lys gaa Glu aaa Lys tca Ser	ser aaa Lys gcg Ala ata Ile ttg Leu 80 agt	96 144 192

Lys	Leu	Asn	Gly 100	Ser	Glu	Gly	Leu	Lys 105	Glu	Lys	Ile	Ala	Ala 110	Ala	Lys	
					ttt Phe											384
ctt Leu	ggt Gly 130	ata Ile	cag Gln	ggc Gly	gtt Val	act Thr 135	gat Asp	gaa Glu	aat Asn	gca Ala	aaa Lys 140	aaa Lys	gct Ala	att Ile	tta Leu	432
					ggt Gly 150											480
					gaa Glu											528
					gag Glu											576
					aat Asn											624
					aca Thr											672
					gtg Val 230											720
					aaa Lys											768
					agt Ser											816
					ata Ile											864
					att Ile											912
					agt Ser 310											960

					caa Gln											1008
					gaa Glu											1056
					caa Gln											1104
	agt Ser 370	cc														1112
<213 <213	0> 32 1> 3° 2> PI 3> Ar	70 RT	lcial	l Sed	quenc	ce										
<220 <220		spC (	Chime	era												
	)> 32		Nan	λαη	50×	Clv	T	7 an	Cly	λαν	Thγ	502	ת א	7 cn	Sor	
1	Ala	Суз	ASII	5	Ser	Gry	цуз	Asp	10	ASII	1111	Ser	ліа	15	261	
Ala	Asp	Glu	Ser 20	Val	Lys	Gly	Pro	Asn 25	Leu	Thr	Glu	Ile	Ser 30	Lys	Lys	
Ile	Thr	Asp 35	Ser	Asn	Ala	Val	Leu 40	Leu	Ala	Val	Lys	Glu 45	Val	Glu	Ala	
Leu	Leu 50		Ser	Ile	Asp	Glu 55		Ala	Lys	Ala	Ile 60		Lys	Lys	Ile	
Lys 65		Asp	Gly	Ser	Leu 70		Asn	Glu	Ala	Asn 75		Asn	Glu	Ser	Leu 80	
	Ala	GĮу	Ala	Tyr 85	Thr	Ile	Ser	Thr	Leu 90		Thr	Gln	Lys	Leu 95		
Lys	Leu	Asn	Gly 100		Glu	Gly	Leu	Lys 105		Lys	Ile	Ala	Ala 110		Lys	
Lys	Cys	Ser 115		Glu	Phe	Ser						Asn 125		Ala	Gln	
Leu	Gly 130		Gln	Gly	Val	Thr 135							Ala	Ile	Leu	
Lys 145		Asn	Ala	Ala	Gly 150		Asp	Lys	Gly	Val 155		Glu	Leu	Glu	Lys 160	
	Ser	Gly	Ser		Glu	Ser	Leu	Ser			Ala	Lys	Glu			
Ala	Asn	Ser		165 Lys	Glu	Leu	Thr		170 Pro	Val	Val	His		175 Asn	Asn	
Ser	Arg		180 Asp	Gly	Asn	Ala		185 Thr	Asn	Ser	Ala		190 Glu	Ser	Val	
Lys	Gly 210	195 Pro	Asn	Leu	Thr	Glu 215	200 Ile	Ser	Lys	Lys	Ile 220	205 Thr	Glu	Ser	Asn	
Ala 225		Val	Leu	Ala	Val 230		Glu	Val	Glu	Thr 235		Leu	Ala	Ser	Ile 240	

Asp	Glu	Leu	Ala	Thr 245	Lys	Ala	Ile	Gly	Lys 250	Lys	Ile	Gly	Asn	Asn 255	Gly	
Leu	Glu	Ala	Asn 260	Gln	Ser	Lys	Asn	Thr 265		Leu	Leu	Ser	Gly 270		Tyr	
Ala	Ile	Ser 275		Leu	Ile	Ala	Glu 280		Leu	Asn	Val	Leu 285	Lys	Asn	Glu	
Glu	Leu 290		Glu	Lys	Ile	Asp 295		Ala	Lys	Gln	Cys 300		Thr	Glu	Phe	
Thr 305		Lys	Leu	Lys	Ser 310		His	Ala	Val	Leu 315		Leu	Asp	Asn	Leu 320	
	Asp	Asp	Asn	Ala 325		Arg	Ala	Ile	Leu 330	Lys	Lys	His	Ala	Asn 335	Lys	·
Asp	Lys	Gly	Ala 340	Ala	Glu	Leu	Glu	Lys 345		Phe	Lys	Ala	Val 350		Asn	
Leu	Ser	Lys 355		Ala	Gln	Asp	Thr 360		Lys	Asn	Ala	Val 365		Glu	Leu	
Thr	Ser 370															
<211 <212	)> 33 l> 13 2> DM 3> An	113 NA	icia	l Sec	quenc	ce										
<220 <223		spC (	Chime	era												
	l> CI ?> (1	os L)	. (11	13)												
	)> 33															4.0
atg Met 1	gct Ala	tgt Cys	aat Asn	aat Asn 5	tca Ser	Gly	aaa Lys	gat Asp	ggg Gly 10	aat Asn	aca Thr	Ser	gca Ala	Asn 15	Ser	48
gct Ala	gat Asp	gag Glu	tct Ser 20	gtt Val	aaa Lys	ggg Gly	cct Pro	aat Asn 25	ctt Leu	aca Thr	gaa Glu	ata Ile	agt Ser 30	aaa Lys	aaa Lys	96
att Ile	acg Thr	gat Asp 35	tct Ser	aat Asn	gcg Ala	gtt Val	tta Leu 40	ctt Leu	gct Ala	gtg Val	aaa Lys	gag Glu 45	gtt Val	gaa Glu	gcg Ala	144
				ata Ile												192
aaa Lys 65	aac Asn	gat Asp	ggt Gly	agt Ser	tta Leu 70	gat Asp	aat Asn	gaa Glu	gca Ala	aat Asn 75	cgc Arg	aac Asn	gag Glu	tca Ser	ttg Leu 80	240
tta Leu	gca Ala	gga Gly	gct Ala	tat Tyr 85	aca Thr	ata Ile	tca Ser	acc Thr	tta Leu 90	ata Ile	aca Thr	caa Gln	aaa Lys	tta Leu 95	agt Ser	288
aaa	tta	aac	gga	tca	gaa	ggt	tta	aag	gaa	aag	att	gcc	gca	gct	aag	336

Lys Leu		Gly 100	Ser	Glu	Gly	Leu	Lys 105	Glu	Lys	Ile	Ala	Ala 110	Ala	Lys	
aaa tgc Lys Cys															384
ctt ggt Leu Gly 130	Ile														432
aaa gca Lys Ala 145															480
ttg tcc Leu Ser															528
gct aat Ala Asn	Ser														576
tca ggg Ser Gly															624
aaa ggg Lys Gly 210	Pro														672
gca gtt Ala Val 225															720
gat gag Asp Glu															768
tta gat Leu Asp	Asn														816
tta att Leu Ile															864
gga gaa Gly Glu 290	Leu														912
ttt act Phe Thr 305															960

					gca Ala											1008
					gat Asp											1056
					gct Ala											1104
	aca Thr 370	_														1113
<21:		71 RT	icia	l Sed	quenc	ce										
		spC (	Chime	era												
	O> 34 Ala		Asn	Asn	Ser	Gly	Lys	Asp	Gly 10	Asn	Thr	Ser	Ala	Asn 15	Ser	
	Asp	Glu	Ser 20	Val	Lys	Gly	Pro	Asn 25		Thr	Glu	Ile	Ser 30		Lys	
Ile	Thr	Asp 35		Asn	Ala	Val	Leu 40		Ala	Val	Lys	Glu 45		Glu	Ala	
Leu	Leu 50		Ser	Ile	Asp	Glu 55		Ala	Lys	Ala	Ile 60	Gly	Lys	Lys	Ile	
Lys 65	Asn	Asp	Gly	Ser	Leu 70		Asn	Glu	Ala	Asn 75	Arg	Asn	Glu	Ser	Leu 80	
Leu	Ala	Gly	Ala	Tyr 85	Thr	Ile	Ser	Thr	Leu 90	Ile	Thr	Gln	Lys	Leu 95	Ser	
Lys	Leu	Asn	Gly 100	Ser	Glu	Gly	Leu	Lys 105	Glu	Lys	Ile	Ala	Ala 110	Ala	Lys	
Lys	Суѕ	Ser 115	Glu	Glu	Phe	Ser	Thr 120	Lys	Leu	Lys	Asp	Asn 125	His	Ala	Gln	
Leu	Gly 130	Ile	Gln	Gly	Val	Thr 135	Asp	Glu	Asn	Ala	Lys 140	Lys	Ala	Ile	Leu	
Lys 145	Ala	Asn	Ala	Ala	Gly 150	Lys	Asp	Lys	Gly	Val 155	Glu	Glu	Leu	Glu	Lys 160	
Leu	Ser	Gly	Ser	Leu 165	Glu	Ser	Leu	Ser	Lys 170	Ala	Ala	Lys	Glu	Met 175	Leu	
			180	_	Glu			185					190			
Ser	Gly	Lys 195	Asp	Gly	Asn	Thr	Ser 200	Ala	Asn	Ser	Ala	Asp 205	Glu	Ser	Val	
Lys	Gly 210	Pro	Asn	Leu	Thr	Glu 215	Ile	Ser	Lys	Lys	Ile 220	Thr	Glu	Ser	Asn	
Ala 225	Val	Val	Leu	Ala	Val 230	Lys	Glu	Val	Glu	Thr 235	Leu	Leu	Thr	Ser	Ile 240	

Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Val Ser 250 Leu Asp Asn Glu Ala Asp His Asn Gly Ser Leu Ile Ser Gly Ala Tyr 260 265 Leu Ile Ser Asn Leu Ile Thr Lys Lys Ile Ser Ala Ile Lys Asp Ser 280 Gly Glu Leu Lys Ala Glu Ile Glu Lys Ala Lys Lys Cys Ser Glu Glu 295 300 Phe Thr Ala Lys Leu Lys Gly Glu His Thr Asp Leu Gly Lys Glu Gly 310 315 Val Thr Asp Asp Asn Ala Lys Lys Ala Ile Leu Lys Thr Asn Asn Asp 325 330 Lys Thr Lys Gly Ala Asp Glu Leu Glu Lys Leu Phe Glu Ser Val Lys 340 345 350 Asn Leu Ser Lys Ala Ala Lys Glu Met Leu Thr Asn Ser Val Lys Glu 355 360 365 Leu Thr Ser 370

```
<210> 35
<211> 1112
<212> DNA
<213> Artificial Sequence
<220>
<223> OspC Chimera
<221> CDS
<222> (1)...(1112)
<400> 35
                                                                    48
atg gct tgt aat aat tca ggg aaa gat ggg aat aca tct gca aat tct
Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser
                                                                    96
qct gat gag tct gtt aaa ggg cct aat ctt aca gaa ata agt aaa aaa
Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys
             20
                                  25
                                                                    144
att acg gat tot aat gcg gtt tta ott gct gtg aaa gag gtt gaa gcg
Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala
         35
                              40
ttq ctg tca tct ata gat gag ctt gct aaa gct att ggt aaa aaa ata
                                                                    192
Leu Leu Ser Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile
     50
                         55
aaa aac gat ggt agt tta gat aat gaa gca aat cgc aac gag tca ttg
                                                                    240
Lys Asn Asp Gly Ser Leu Asp Asn Glu Ala Asn Arg Asn Glu Ser Leu
                     70
 65
```

					aca Thr											288
					gaa Glu											336
					ttt Phe											384
					gtt Val											432
					ggt Gly 150											480
					gaa Glu											528
					gag Glu											576
tca Ser	gga Gly	aaa Lys 195	gat Asp	G] À aaa	aat Asn	aca Thr	tct Ser 200	gca Ala	aat Asn	tct Ser	gct Ala	gat Asp 205	gag Glu	tct Ser	gtt Val	624
aaa Lys	ggg Gly 210	cct Pro	aat Asn	ctt Leu	aca Thr	gaa Glu 215	ata Ile	agt Ser	aaa Lys	aaa Lys	att Ile 220	aca Thr	gaa Glu	tct Ser	aac Asn	672
					gtg Val 230											720
					aaa Lys											768
ggt Gly	tta Leu	gct Ala	gtc Val 260	gaa Glu	gcg Ala	ggg Gly	cat His	aat Asn 265	gga Gly	aca Thr	ttg Leu	tta Leu	gca Ala 270	ggt Gly	gct Ala	816
					cta Leu											864
					gaa Glu											912

305											caa Gln					960
											tta Leu					1008
											cta Leu					1056
											gct Ala					1104
	ctt Leu 370	ac														1112
<21:	0> 30 1> 3° 2> PI 3> A	70 RT	icial	L Sec	quenc	ce										
<22 <22		spC (	Chime	era												
<40	)> 36	5														
	Ala	Cys	Asn	_	Ser	Gly	Lys	Asp		Asn	Thr	Ser	Ala	Asn	Ser	
1				5					10					15		
	Asp	Glu	Ser 20	-	Lys	Gly	Pro	Asn 25		Thr	Glu	Ile	Ser 30		Lys	
Ala			20	Val	_			25	Leu		Glu Lys		30	Lys		
Ala	Thr	Asp 35	20 Ser	Val Asn	Ala	Val	Leu 40	25 Leu	Leu	Val		Glu 45	30 Val	Lys Glu	Ala	
Ala Ile Leu	Thr Leu 50	Asp 35 Ser	20 Ser Ser	Val Asn Ile	Ala Asp	Val Glu 55	Leu 40 Leu	25 Leu Ala	Leu Ala Lys	Val Ala	Lys	Glu 45 Gly	30 Val Lys	Lys Glu Lys	Ala Ile	
Ala Ile Leu Lys 65	Thr Leu 50 Asn	Asp 35 Ser Asp	20 Ser Ser Gly	Val Asn Ile Ser Tyr	Ala Asp Leu 70	Val Glu 55 Asp	Leu 40 Leu Asn	25 Leu Ala Glu	Leu Ala Lys Ala	Val Ala Asn 75	Lys Ile 60	Glu 45 Gly Asn	30 Val Lys Glu	Lys Glu Lys Ser	Ala Ile Leu 80	
Ala Ile Leu Lys 65 Leu	Thr Leu 50 Asn	Asp 35 Ser Asp	20 Ser Ser Gly Ala	Val Asn Ile Ser Tyr	Ala Asp Leu 70 Thr	Val Glu 55 Asp	Leu 40 Leu Asn Ser	25 Leu Ala Glu Thr	Leu Ala Lys Ala Leu 90	Val Ala Asn 75 Ile	Lys Ile 60 Arg	Glu 45 Gly Asn Gln	30 Val Lys Glu Lys	Lys Glu Lys Ser Leu 95	Ala Ile Leu 80 Ser	
Ile Leu Lys 65 Leu Lys	Thr Leu 50 Asn Ala Leu	Asp 35 Ser Asp Gly Asn	Ser Ser Gly Ala Gly 100	Val Asn Ile Ser Tyr 85 Ser	Ala Asp Leu 70 Thr	Val Glu 55 Asp Ile Gly	Leu 40 Leu Asn Ser Leu	Leu Ala Glu Thr Lys 105	Leu Ala Lys Ala Leu 90 Glu	Val Ala Asn 75 Ile Lys	Lys Ile 60 Arg	Glu 45 Gly Asn Gln Ala	30 Val Lys Glu Lys Ala 110	Lys Glu Lys Ser Leu 95 Ala	Ala Ile Leu 80 Ser Lys	
Ile Leu Lys 65 Leu Lys	Thr Leu 50 Asn Ala Leu Cys	Asp 35 Ser Asp Gly Asn Ser 115	Ser Ser Gly Ala Gly 100 Glu	Asn Ile Ser Tyr 85 Ser Glu	Ala Asp Leu 70 Thr Glu Phe	Val Glu 55 Asp Ile Gly Ser	Leu 40 Leu Asn Ser Leu Thr	Leu Ala Glu Thr Lys 105 Lys	Leu Ala Lys Ala Leu 90 Glu Leu	Val Ala Asn 75 Ile Lys	Lys Ile 60 Arg Thr	Glu 45 Gly Asn Gln Ala Asn 125	30 Val Lys Glu Lys Ala 110 His	Lys Glu Lys Ser Leu 95 Ala	Ala Ile Leu 80 Ser Lys Gln	
Ile Leu Lys 65 Leu Lys Lys	Thr Leu 50 Asn Ala Leu Cys Gly 130	Asp 35 Ser Asp Gly Asn Ser 115 Ile	Ser Ser Gly Ala Gly 100 Glu	Asn Ile Ser Tyr 85 Ser Glu Gly	Ala Asp Leu 70 Thr Glu Phe Val	Val Glu 55 Asp Ile Gly Ser Thr 135	Leu 40 Leu Asn Ser Leu Thr 120 Asp	Leu Ala Glu Thr Lys 105 Lys Glu	Leu Ala Lys Ala Leu 90 Glu Leu Asn	Val Ala Asn 75 Ile Lys Lys Ala	Lys Ile 60 Arg Thr Ile Asp	Glu 45 Gly Asn Gln Ala Asn 125 Lys	30 Val Lys Glu Lys Ala 110 His	Lys Glu Lys Ser Leu 95 Ala Ala Ile	Ala Ile Leu 80 Ser Lys Gln Leu	
Ile Leu Lys 65 Leu Lys Lys Lys Lys Leu Lys	Thr Leu 50 Asn Ala Leu Cys Gly 130 Ala	Asp 35 Ser Asp Gly Asn Ser 115 Ile	Ser Ser Gly Ala Gly 100 Glu Gln Ala	Asn Ile Ser Tyr 85 Ser Glu Gly Ala	Ala Asp Leu 70 Thr Glu Phe Val Gly 150	Val Glu 55 Asp Ile Gly Ser Thr 135 Lys	Leu 40 Leu Asn Ser Leu Thr 120 Asp	Leu Ala Glu Thr Lys 105 Lys Glu Lys	Leu Ala Lys Ala Leu 90 Glu Leu Asn Gly	Val Ala Asn 75 Ile Lys Lys Ala Val 155	Lys Ile 60 Arg Thr Ile Asp Lys 140	Glu 45 Gly Asn Gln Ala Asn 125 Lys	30 Val Lys Glu Lys Ala 110 His Ala Leu	Glu Lys Ser Leu 95 Ala Ala Ile Glu	Ala Ile Leu 80 Ser Lys Gln Leu Lys 160	
Ile Leu Lys 65 Leu Lys Lys Lys Leu Lys Leu	Thr Leu 50 Asn Ala Leu Cys Gly 130 Ala Ser	Asp 35 Ser Asp Gly Asn Ser 115 Ile Asn	Ser Ser Gly Ala Gly 100 Glu Gln Ala Ser	Asn Ile Ser Tyr 85 Ser Glu Gly Ala Leu 165	Ala Asp Leu 70 Thr Glu Phe Val Gly 150 Glu	Val Glu 55 Asp Ile Gly Ser Thr 135 Lys Ser	Leu 40 Leu Asn Ser Leu Thr 120 Asp Asp	Leu Ala Glu Thr Lys 105 Lys Glu Lys Ser	Leu Ala Lys Ala Leu 90 Glu Leu Asn Gly Lys 170	Val Ala Asn 75 Ile Lys Lys Ala Val 155 Ala	Lys Ile 60 Arg Thr Ile Asp Lys 140 Glu	Glu 45 Gly Asn Gln Ala Asn 125 Lys Glu Lys	30 Val Lys Glu Lys Ala 110 His Ala Leu Glu	Glu Lys Ser Leu 95 Ala Ala Ile Glu Met 175	Ala Ile Leu 80 Ser Lys Gln Leu Lys 160 Leu	

Lys Gly 210															
	Pro	Asn	Leu	Thr	Glu 215	Ile	Ser	Lys	Lys	Ile 220	Thr	Glu	Ser	Asn	
Ala Val 225	Val	Leu	Ala	Val 230		Glu	Ile	Glu	Thr 235		Leu	Ala	Ser	Ile 240	
Asp Glu	Leu	Ala	Thr 245		Ala	Ile	Gly	Lys 250		Ile	Gln	Gln	Asn 255		
Gly Leu	Ala	Val 260		Ala	Gly	His	Asn 265		Thr	Leu	Leu	Ala 270		Ala	
Tyr Thr	Ile 275		Lys	Leu	Ile	Thr 280		Lys	Leu	Asp	Gly 285		Lys	Asn	
Ser Glu 290		Leu	Lys	Glu	Lys 295		Glu	Asn	Ala	Lys 300		Cys	Ser	Glu	
Asp Phe	Thr	Lys	Lys	Leu 310		Gly	Glu	His	Ala 315		Leu	Gly	Ile	Glu 320	
Asn Val	Thr	Asp	Glu 325		Ala	Lys	Lys	Ala 330		Leu	Ile	Thr	Asp 335		
Ala Lys	Asp	Lys 340		Ala	Ala	Glu	Leu 345		Lys	Leu	Phe	Lys 350		Val	
Glu Asn	Leu 355	-	Lys	Ala	Ala	Lys 360		Met	Leu	Ala	Asn 365		Val	Lys	
Glu Leu 370	555														
370															
<210> 3° <211> 1°															
<212> D	AV	ai al	500	**************************************	70										
<213> A:	LCILI	Clai	. sec	quem	Je										
<220> <223> 0	spC C	hime	era												
<221> CI															
<222> (3 <400> 3	1) 7	(110	)6)												
<222> (	1) 7 tgt	(110 aat	)6) aat	tca Ser	gga Gly	aaa Lys	gat Asp	ggg Gly	aat Asn	gca Ala	tct Ser	gca Ala	aat Asn	tct Ser	48
<222> (3 <400> 3 atg gct	1) 7 tgt	(110 aat	)6) aat	tca Ser	gga Gly	aaa Lys	gat Asp	ggg Gly 10	aat Asn	gca Ala	tct Ser	gca Ala	aat Asn 15	tct Ser	48
<222> ( <400> 3 atg gct Met Ala 1 gct gat	1)  7  tgt  Cys  gag	(110 aat Asn tct	aat Asn 5	Ser	ggg	Lys	Asp	Gly 10 ctt	Asn	Ala gaa	Ser	Ala	Asn 15 aaa	Ser	48 96
<222> ( <400> 3' atg gct Met Ala 1	1)  7  tgt  Cys  gag	(110 aat Asn tct	aat Asn 5	Ser	ggg	Lys	Asp	Gly 10 ctt	Asn	Ala gaa	Ser	Ala	Asn 15 aaa	Ser	
<222> ( <400> 3 atg gct Met Ala 1 gct gat Ala Asp att aca	1)  7 tgt Cys gag Glu gaa	(110 aat Asn tct Ser 20 tct	aat Asn 5 gtt Val	Ser aaa Lys gca	Gly ggg Gly gtt	Lys cct Pro	Asp aat Asn 25 ctg	Gly 10 ctt Leu gcc	Asn aca Thr	Ala gaa Glu aaa	Ser ata Ile gaa	Ala agt Ser 30 gtt	Asn 15 aaa Lys gag	Ser aaa Lys acc	
<222> ( <400> 3 atg gct Met Ala 1 gct gat Ala Asp	1)  7 tgt Cys gag Glu gaa	(110 aat Asn tct Ser 20 tct	aat Asn 5 gtt Val	Ser aaa Lys gca	Gly ggg Gly gtt	Lys cct Pro	Asp aat Asn 25 ctg	Gly 10 ctt Leu gcc	Asn aca Thr	Ala gaa Glu aaa	Ser ata Ile gaa	Ala agt Ser 30 gtt	Asn 15 aaa Lys gag	Ser aaa Lys acc	96
<222> ( <400> 3 atg gct Met Ala 1 gct gat Ala Asp att aca Ile Thr	1)  7 tgt Cys gag Glu gaa Glu 35 gca	(110 aat Asn tct Ser 20 tct Ser	aat Asn 5 gtt Val aac Asn	Ser aaa Lys gca Ala	ggg Gly gtt Val	cct Pro gtt Val 40	Asp aat Asn 25 ctg Leu	Gly 10 ctt Leu gcc Ala	Asn aca Thr gtg Val	Ala gaa Glu aaa Lys	Ser ata Ile gaa Glu 45 att	agt Ser 30 gtt Val	Asn 15 aaa Lys gag Glu aaa	aaa Lys acc Thr	96
<222> ( <400> 3 atg gct Met Ala 1 gct gat Ala Asp att aca Ile Thr	1)  7 tgt Cys gag Glu gaa Glu 35 gca	(110 aat Asn tct Ser 20 tct Ser	aat Asn 5 gtt Val aac Asn	Ser aaa Lys gca Ala	ggg Gly gtt Val	cct Pro gtt Val 40	Asp aat Asn 25 ctg Leu	Gly 10 ctt Leu gcc Ala	Asn aca Thr gtg Val	Ala gaa Glu aaa Lys	Ser ata Ile gaa Glu 45 att	agt Ser 30 gtt Val	Asn 15 aaa Lys gag Glu aaa	aaa Lys acc Thr	96 144
<222> ( <400> 3 atg gct Met Ala 1 gct gat Ala Asp att aca Ile Thr tta ctt Leu Leu 50 ata ggc	1) 7 tgt Cys gag Glu 35 gca Ala	(110 aat Asn tct Ser 20 tct Ser tct Ser	aat Asn 5 gtt Val aac Asn ata Ile	Ser aaa Lys gca Ala gat Asp	ggg Gly gtt Val gaa Glu 55	cct Pro gtt Val 40 ctt Leu	Asp aat Asn 25 ctg Leu gct Ala aat	Gly 10 ctt Leu gcc Ala acc Thr	Asn aca Thr gtg Val aaa Lys	gaa Glu aaa Lys gct Ala 60	Ser ata Ile gaa Glu 45 att Ile aac	Ala agt Ser 30 gtt Val ggt Gly aca	Asn 15 aaa Lys gag Glu aaa Lys	aaa Lys acc Thr aaa Lys	96 144
<222> ( <400> 3 atg gct Met Ala 1 gct gat Ala Asp att aca Ile Thr tta ctt Leu Leu 50	1) 7 tgt Cys gag Glu 35 gca Ala	(110 aat Asn tct Ser 20 tct Ser tct Ser	aat Asn 5 gtt Val aac Asn ata Ile	Ser aaa Lys gca Ala gat Asp	ggg Gly gtt Val gaa Glu 55	cct Pro gtt Val 40 ctt Leu	Asp aat Asn 25 ctg Leu gct Ala aat	Gly 10 ctt Leu gcc Ala acc Thr	Asn aca Thr gtg Val aaa Lys	gaa Glu aaa Lys gct Ala 60	Ser ata Ile gaa Glu 45 att Ile aac	Ala agt Ser 30 gtt Val ggt Gly aca	Asn 15 aaa Lys gag Glu aaa Lys	aaa Lys acc Thr aaa Lys	96 144 192

Leu	Ser	Gly	Ala	Tyr 85	Ala	Ile	Ser	Asp	Leu 90	Ile	Ala	Glu	Lys	Leu 95	Asn	
														aag Lys		336
														gtg Val		384
														tta Leu		432
														tta Leu		480
														aaa Lys 175		528
														tca Ser		576
aaa Lys	gat Asp	ggg Gly 195	aat Asn	gca Ala	tct Ser	aca Thr	aat Asn 200	tct Ser	gcc Ala	gat Asp	gag Glu	tct Ser 205	gtt Val	aaa Lys	ggg Gly	624
cct Pro	aat Asn 210	ctt Leu	aca Thr	gaa Glu	ata Ile	agt Ser 215	aaa Lys	aaa Lys	att Ile	aca Thr	gaa Glu 220	tct Ser	aac Asn	gca Ala	gtt Val	672
gtt Val 225	ctg Leu	gcc Ala	gtg Val	aaa Lys	gaa Glu 230	gtt Val	gag Glu	acc Thr	tta Leu	ctt Leu 235	gca Ala	tct Ser	ata Ile	gat Asp	gaa Glu 240	720
														tta Leu 255		768
														gca Ala		816
	_			-	_				_	_			-	gaa Glu		864
														act Thr		912

					cat His 310											960
_		_		_	gct Ala						_			_	_	1008
					gaa Glu											1056
					aca Thr											1104
CC																1106
<211 <212	)> 38 l> 36 2> PF 3> Ar	58 ?T	icial	L Sec	quenc	ce										
<220 <223		spC (	Chime	era												
-	)> 38 Ala		Asn	Asn 5	Ser	Gly	Lys	Asp	Gly 10	Asn	Ala	Ser	Ala	Asn 15	Ser	
	Asp	Glu	Ser 20	Val	Lys	Gly	Pro	Asn 25	Leu	Thr	Glu	Ile	Ser 30	Lys	Lys	
Ile	Thr	Glu 35		Asn	Ala	Val	Val 40		Ala	Val	Lys	Glu 45		Glu	Thr	
Leu	Leu 50		Ser	Ile	Asp	Glu 55		Ala	Thr	Lys	Ala 60		Gly	Lys	Lys	
Ile 65		Asn	Asn	Gly	Leu 70	Glu	Ala	Asn	Gln	Ser 75	Lys	Asn	Thr	Ser	Leu 80	
	Ser	Gly	Ala	Tyr 85	Ala	Ile	Ser	Asp	Leu 90	Ile	Ala	Glu	Lys	Leu 95	Asn	
Val	Leu	Lys	Asn 100		Glu	Leu	Lys	Glu 105	Lys	Ile	Asp	Thr	Ala 110	Lys	Gln	
Суѕ	Ser	Thr 115		Phe	Thr		Lys 120	Leu	Lys	Ser	Glu	His 125	Ala	Val	Leu	
Gly	Leu 130		Asn	Leu	Thr			Asn	Ala	Gln	Arg 140		Ile	Leu	Lys	
Lys 145		Ala	Asn	Lys	Asp 150		Gly	Ala	Ala	Glu 155	Leu	Glu	Lys	Leu	Phe 160	
	Ala	Val	Glu	Asn 165	Leu	Ser	Lys	Ala	Ala 170		Asp	Thr	Leu	Lys 175		
Ala	Val	Lys	Glu 180	Leu	Thr	Ser	Pro	Ile 185	Val	His	Gly	Asn	Asn 190	Ser	Arg	
Lys	Asp	Gly 195		Ala	Ser	Thr	Asn 200		Ala	Asp	Glu	Ser 205		Lys	Gly	
Pro	Asn 210		Thr	Glu	Ile	Ser 215		Lys	Ile	Thr	Glu 220	Ser	Asn	Ala	Val	

225	Ala Val		230					235				_	240	
Leu Ala T	hr Lys	Ala :	Ile	Gly	Lys	Lys	Ile 250	Gly	Asn	Asn	Gly	Leu 255	Glu	
Ala Asn G	Sln Ser 260	Lys :	Asn	Thr	Ser	Leu 265	Leu	Ser	Gly	Ala	Tyr 270	Ala	Ile	
Ser Asp L	Leu Ile 275	Ala	Glu	Lys	Leu 280	Asn	Val	Leu	Lys	Asn 285	Glu	Glu	Leu	
Lys Glu L 290	Lys Ile	Asp '	Thr	Ala 295	Lys	Gln	Cys	Ser	Thr 300	Glu	Phe	Thr	Asn	
Lys Leu L 305	Lys Ser		His 310	Ala	Val	Leu	Gly	Leu 315	Asp	Asn	Leu	Thr	Asp 320	
Asp Asn A	Ala Gln	Arg 2 325	Ala	Ile	Leu	Lys	Lys 330	His	Ala	Asn	Lys	Asp 335	Lys	
Gly Ala A	Ala Glu 340	Leu	Glu	Lys	Leu	Phe 345	Lys	Ala	Val	Glu	Asn 350	Leu	Ser	
Lys Ala A 3		Asp '	Thr	Leu	Lys 360		Ala	Val	Lys	Glu 365		Thr	Ser	
<210> 39 <211> 110 <212> DNA <213> Art	A	l Seq	uenc	:e										
<220> <223> Osp	oC Chime	era												
	,													
<221> CDS <222> (1)		07)												
<222> (1) <400> 39	(110		tca	aaa	222	rat	aaa	aat	gca	tct	gca	aat	tct	48
<222> (1)	(110	aat												48
<222> (1) <400> 39 atg gct t Met Ala C	gt aat Cys Asn	aat Asn 5	Ser aaa	Gly	Lys	Asp	Gly 10 ctt	Asn	Ala	Ser	Ala	Asn 15 aaa	Ser	48 96
<222> (1) <400> 39 atg gct t Met Ala C 1 gct gat g	egt aat Cys Asn gag tot Glu Ser 20	aat Asn 5 gtt Val	Ser aaa Lys gca	Gly ggg Gly gtt	Lys cct Pro	Asp aat Asn 25 ctg	Gly 10 ctt Leu gcc	Asn aca Thr	Ala gaa Glu aaa	Ser ata Ile gaa	Ala agt Ser 30 gtt	Asn 15 aaa Lys gag	Ser aaa Lys acc	
<222> (1) <400> 39 atg gct t Met Ala C 1 gct gat g Ala Asp G att aca g	gag tct Glu Ser 20 gaa tct Glu Ser 35 gca tct	aat Asn 5 gtt Val aac Asn	aaa Lys gca Ala	ggg Gly gtt Val	Lys cct Pro gtt Val 40 ctt	Asp aat Asn 25 ctg Leu gct	Gly 10 ctt Leu gcc Ala	Asn aca Thr gtg Val	Ala gaa Glu aaa Lys gct	Ser ata Ile gaa Glu 45 att	agt Ser 30 gtt Val	Asn 15 aaa Lys gag Glu aaa	ser aaa Lys acc Thr	96
<222> (1) <400> 39 atg gct t Met Ala C 1 gct gat g Ala Asp G att aca g Ile Thr G tta ctt g Leu Leu A	ggt aat Cys Asn  gag tct Glu Ser 20  gaa tct Glu Ser 35  gca tct Ala Ser	aat Asn 5 gtt Val aac Asn ata Ile	ser aaa Lys gca Ala gat Asp	Gly ggg Gly gtt Val gaa Glu 55	Lys cct Pro gtt Val 40 ctt Leu gcc	Asp aat Asn 25 ctg Leu gct Ala	Gly 10 ctt Leu gcc Ala acc Thr	Asn aca Thr gtg Val aaa Lys	Ala gaa Glu aaa Lys gct Ala 60 aaa	Ser ata Ile gaa Glu 45 att Ile aac	Ala agt Ser 30 gtt Val ggt Gly aca	Asn 15 aaa Lys gag Glu aaa Lys	ser  aaa Lys  acc Thr  aaa Lys	96
<222> (1) <400> 39 atg gct t Met Ala C 1 gct gat g Ala Asp G att aca g Ile Thr G tta ctt g Leu Leu A 50 ata ggc a Ile Gly A	ggt aat Cys Asn  gag tct Glu Ser 20  gaa tct Glu Ser 35  gca tct Ala Ser aat aat Asn Asn	aat Asn 5 gtt Val aac Asn ta Ile ggt Gly	Ser aaa Lys gca Ala gat Asp ttau 70 gca	Gly ggg Gly gtt Val gaa Glu 55 gag Glu ata	Lys cct Pro gtt Val 40 ctt Leu gcc Ala	Asp aat Asn 25 ctg Leu gct Ala aat Asn	Gly 10 ctt Leu gcc Ala acc Thr cag Gln cta	Asn aca Thr gtg Val aaa Lys agt Ser 75 ata	Ala gaa Glu aaa Lys gct Ala 60 aaa Lys	Ser ata Ile gaa Glu 45 att Ile aac Asn gaa	Ala agt Ser 30 gtt Val ggt Gly aca Thr	Asn 15 aaa Lys gag Glu aaa Lys tca Ser	aaa Lys acc Thr aaa Lys ttg Leu 80 aat	96 144 192

Val	Leu	Lys	Asn 100	Glu	Glu	Leu	Lys	Glu 105	Lys	Ile	Asp	Thr	Ala 110	Lys	Gln	
														gtg Val		384
														tta Leu		432
														tta Leu		480
														aaa Lys 175		528
														tca Ser		576
														aaa Lys		624
														gca Ala		672
gtt Val 225	ctc Leu	gcc Ala	gtg Val	aaa Lys	gaa Glu 230	gtt Val	gaa Glu	act Thr	ttg Leu	ctt Leu 235	aca Thr	tct Ser	ata Ile	gat Asp	gag Glu 240	720
														tta Leu 255		768
														tta Leu		816
														gga Gly		864
ttg Leu	aag Lys 290	gca Ala	gaa Glu	att Ile	gaa Glu	aag Lys 295	gct Ala	aag Lys	aaa Lys	tgt Cys	tct Ser 300	gaa Glu	gaa Glu	ttt Phe	act Thr	912
														gtt Val		960

														aaa Lys 335		1008
														aac Asn		1056
														ctt Leu		1104
agc Ser																1107
<211 <212	)> 4( L> 36 2> PF 3> A1	59 RT	lcial	L Sec	quenc	ce										
<220 <223		spC (	Chime	era												
	)> 4(		λαη	λερ	Sor	Gly	Luc	Aen	Cl v	Δen	Δla	Sar	Δla	Asn	Ser	
1		_		5		_	_	_	10					15		
Ala	Asp	Glu	Ser 20	Val	Lys	Gly	Pro	Asn 25	Leu	Thr	Glu	Ile	Ser 30	Lys	Lys	
Ile	Thr	Glu 35	Ser	Asn	Ala	Val	Val 40	Leu	Ala	Val	Lys	Glu 45	Val	Glu	Thr	
Leu	Leu 50		Ser	Ile	Asp	Glu 55		Ala	Thr	Lys	Ala 60		Gly	Lys	Lys	
Ile 65		Asn	Asn	Gly	Leu 70		Ala	Asn	Gln	Ser 75		Asn	Thr	Ser	Leu 80	
	Ser	Gly	Ala	Tyr 85		Ile	Ser	Asp	Leu 90		Ala	Glu	Lys	Leu 95		
Val	Leu	Lys	Asn 100		Glu	Leu	Lys	Glu 105		Ile	Asp	Thr	Ala 110	Lys	Gln	
Cys	Ser			Phe	Thr	Asn	Lys 120		Lys	Ser	Glu	His 125		Val	Leu	
Gly	Leu 130	115 Asp	Asn	Leu	Thr	Asp 135	Asp	Asn	Ala	Gln	Arg 140		Ile	Leu	Lys	
		Ala	Asn	Lys			Gly	Ala	Ala			Glu	Lys	Leu		
145 Lys	Ala	Val	Glu	Asn	150 Leu	Ser	Lys	Ala	Ala	155 Gln	Asp	Thr	Leu	Lys	160 Asn	
Ala	Val	Lys	Glu	165 Leu	Thr	Ser	Pro		170 Val	His	Gly	Asn		175 Ser	Gly	
Lvs	Asp	Glv	180 Asn	Thr	Ser	Ala	Asn	185 Ser	Ala	Asp	Glu	Ser	190 Val	Lys	Gly	
-		195					200					205		Ala		
	210					215					220					
Val 225	Leu	Ala	Val	Lys	Glu 230	Val	Glu	Thr	Leu	Leu 235	Thr	ser	TTE	Asp	Glu 240	

Leu																
	Ala	Lys	Ala	Ile 245	Gly	Lys	Lys	Ile	Lys 250	Asn	Asp	Val	Ser	Leu 255	Asp	
Asn	Glu	Ala	Asp 260		Asn	Gly	Ser	Leu 265		Ser	Gly	Ala	Tyr 270		Ile	
Ser	Asn	Leu 275		Thr	Lys	Lys	Ile 280		Ala	Ile	Lys	Asp 285		Gly	Glu	
Leu	Lys 290		Glu	Ile	Glu	Lys 295		Lys	Lys	Cys	Ser 300		Glu	Phe	Thr	
Ala 305		Leu	Lys	Gly	Glu 310		Thr	Asp	Leu	Gly 315		Glu	Gly	Val	Thr 320	
Asp	Asp	Asn	Ala	Lys 325	Lys	Ala	Ile	Leu	Lys 330	Thr	Asn	Asn	Asp	Lys 335	Thr	
Lys	Gly	Ala	Asp 340		Leu	Glu	Lys	Leu 345		Glu	Ser	Val	Lys 350		Leu	
Ser	Lys	Ala 355		Lys	Glu	Met	Leu 360		Asn	Ser	Val	Lys 365		Leu	Thr	
Ser		300					300					303				
<212 <212	0> 41 1> 11 2> Dt 3> Ar	106 NA	icial	L Sec	quenc	ce										
<220 <220	0> 3> 0s	spC (	Chime	era												
	1> CI 2> (3		. (110	06)												
<400	0> 43	Ĺ														
					tca Ser											48
			tct	att	aaa	~~~										
		0	Ser 20		Lys					aca Thr						96
		gaa	20 tct	Val		Gly	Pro gtt	Asn 25 ctg	Leu gcc	Thr	Glu aaa	Ile gaa	Ser 30 gtt	Lys gag	Lys	96
Ile tta	Thr	gaa Glu 35 gca	20 tct Ser	Val aac Asn	Lys	Gly gtt Val gaa	Pro gtt Val 40 ctt	Asn 25 ctg Leu gct	Leu gcc Ala acc	Thr gtg Val aaa	Glu aaa Lys gct	gaa Glu 45 att	Ser 30 gtt Val ggt	Lys gag Glu aaa	Lys acc Thr	
Ile tta Leu ata	Thr ctt Leu 50 ggc	gaa Glu 35 gca Ala	20 tct Ser tct Ser	Val aac Asn ata Ile	Lys gca Ala gat	gtt Val gaa Glu 55	gtt Val 40 ctt Leu	Asn 25 ctg Leu gct Ala	Leu gcc Ala acc Thr	Thr gtg Val aaa Lys	Glu aaa Lys gct Ala 60 aaa	gaa Glu 45 att Ile	Ser 30 gtt Val ggt Gly aca	gag Glu aaa Lys	Lys acc Thr aaa Lys	144
tta Leu ata Ile 65	Thr ctt Leu 50 ggc Gly tca	gaa Glu 35 gca Ala aat Asn	tct Ser tct Ser aat Asn	Val aac Asn ata Ile ggt Gly tat	gca Ala gat Asp tta Leu	Gly gtt Val gaa Glu 55 gag Glu	Pro gtt Val 40 ctt Leu gcc Ala	Asn 25 ctg Leu gct Ala aat Asn	Leu gcc Ala acc Thr cag Gln cta	Thr gtg Val aaa Lys agt Ser 75 ata	Glu aaa Lys gct Ala 60 aaa Lys	gaa Glu 45 att Ile aac Asn	Ser 30 gtt Val ggt Gly aca Thr	Lys gag Glu aaa Lys tca Ser	acc Thr aaa Lys ttg Leu 80	144

Val	Leu	Lys	Asn 100	Glu	Glu	Leu	Lys	Glu 105	Lys	Ile	Asp	Thr	Ala 110	Lys	Gln	
						aat Asn										384
						gat Asp 135										432
						aag Lys										480
						tca Ser										528
						agt Ser										576
						gca Ala										624
						agt Ser 215										672
						att Ile										720
						ggt Gly										768
						aat Asn										816
						caa Gln										864
						gaa Glu 295										912
						gaa Glu										960
act	gat	gag	aat	gca	aaa	aaa	gct	att	tta	ata	aca	gat	gca	gct	aaa	1008

Thr Asp Glu Asn Ala Lys Lys Ala Ile Leu Ile Thr Asp Ala Ala Lys 330 gat aag ggc gct gca gag ctt gaa aag cta ttt aaa gca gta gaa aac 1056 Asp Lys Gly Ala Ala Glu Leu Glu Lys Leu Phe Lys Ala Val Glu Asn 340 ttg gca aaa gca gct aaa gag atg ctt gct aat tca gtt aaa gag ctt 1104 Leu Ala Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu 360 ac 1106 <210> 42 <211> 368 <212> PRT <213> Artificial Sequence <220> <223> OspC Chimera <400> 42 Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Ala Ser Ala Asn Ser 10 Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys 20 Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu Thr 40 Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala Asn Gln Ser Lys Asn Thr Ser Leu 70 75 Leu Ser Gly Ala Tyr Ala Ile Ser Asp Leu Ile Ala Glu Lys Leu Asn 90 Val Leu Lys Asn Glu Glu Leu Lys Glu Lys Ile Asp Thr Ala Lys Gln 100 105 Cys Ser Thr Glu Phe Thr Asn Lys Leu Lys Ser Glu His Ala Val Leu 120 Gly Leu Asp Asn Leu Thr Asp Asp Asn Ala Gln Arg Ala Ile Leu Lys

| Solution | Solution

210 215 220

Val Leu Ala Val Lys Glu Ile Glu Thr Leu Leu Ala Ser Ile Asp Glu
225 230 235 240

Leu Ala Thr Lys Ala Ile Gly Lys Lys Ile Gln Gln Asn Gly Gly Leu
245 250 250

Ala	Val	Glu	Ala 260	Gly	His	Asn	Gly	Thr 265	Leu	Leu	Ala	Gly	Ala 270	Tyr	Thr	
Ile	Ser	Lys 275		Ile	Thr	Gln	Lys 280		Asp	Gly	Leu	Lys 285		Ser	Glu	
Lys	Leu 290	Lys	Glu	Lys	Ile	Glu 295	Asn	Ala	Lys	Lys	Cys 300	Ser	Glu	Asp	Phe	
Thr 305	Lys	Lys	Leu	Glu	Gly 310	Glu	His	Ala	Gln	Leu 315	Gly	Ile	Glu	Asn	Val 320	
Thr	Asp	Glu	Asn	Ala 325	Lys	Lys	Ala	Ile	Leu 330	Ile	Thr	Asp	Ala	Ala 335	Lys	
Asp	Lys	Gly	Ala 340	Ala	Glu	Leu	Glu	Lys 345	Leu	Phe	Lys	Ala	Val 350	Glu	Asn	
Leu	Ala	Lys 355	Ala	Ala	Lys	Glu	Met 360	Leu	Ala	Asn	Ser	Val 365	Lys	Glu	Leu	
<213	)> 43 L> 63	33														
	2> D1 3> Bc	NA orrel	ia k	ourgo	lorfe	eri										
<220		<b>.</b>														
	L> CI 2> (1	l)	(633	3)												
<401	0> 43	3														
atg	aaa	aag Lys	aat Asn	aca Thr	tta Leu	agt Ser	gcg Ala	ata Ile	tta Leu	atg Met	act Thr	tta Leu	ttt Phe	tta Leu	ttt Phe	48
1	_10	-1-		5					10					15		
ata Ile	tct Ser	tgt Cys	aat Asn	aat Asn	tca Ser	ggg Gly	aaa Lys	gat Asp	ggg Gly	aat Asn	aca Thr	tct Ser	gca Ala	aat Asn	tct Ser	96
		-	20			_	_	25	_				30			
gct Ala	gat Asp	gag Glu	tct Ser	gtt Val	aaa Lys	ggg Gly	cct Pro	aat Asn	ctt Leu	aca Thr	gaa Glu	ata Ile	aat Asn	aaa Lys	aaa Lys	144
		35					40					45				
att Ile	Thr	gat Asp	tct Ser	aat Asn	gcg Ala	Val	tta Leu	ctt Leu	gct Ala	gtg Val	Lys	gag Glu	gtt Val	gaa Glu	gcg Ala	192
	50					55					60					240
Leu	ctg Leu	tca Ser	Ser	Ile	Asp	gaa Glu	Ile	gct Ala	Ala	Lys	gct Ala	Ile	ggt	aaa Lys	aaa Lys 80	240
65					70		~~+		~	75	22+	929	22+	~~~		288
Ile	His	caa Gln	Asn	Asn	Gly	Leu	Asp	Thr	Glu 90	Asn	Asn	His	Asn	Gly 95	Ser	200
++~	++>	gcg	aas	85	tat	ac =	a+=	tca		cta	ata	222	caa		tta	336
Leu	Leu	Ala	Gly 100	Ala	Tyr	Ala	Ile	Ser 105	Thr	Leu	Ile	Lys	Gln 110	Lys	Leu	550
								_ 5 5								

			gaa Glu								384
			ttt Phe								432
			gtt Val 150								480
			aaa Lys								528
_		_	 gtc Val	_		_	_		_	_	576
			ctt Leu								624
cct Pro 210	taa *										633

```
<210> 44
```

<211> 210

<212> PRT

<213> Borrelia burgdorferi

### <400> 44

Met Lys Lys Asn Thr Leu Ser Ala Ile Leu Met Thr Leu Phe Leu Phe 10 Ile Ser Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Asn Lys Lys 40 Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala 55 Leu Leu Ser Ser Ile Asp Glu Ile Ala Ala Lys Ala Ile Gly Lys Lys 65 70 75 80 Ile His Gln Asn Asn Gly Leu Asp Thr Glu Asn Asn His Asn Gly Ser 90 Leu Leu Ala Gly Ala Tyr Ala Ile Ser Thr Leu Ile Lys Gln Lys Leu 105 100 Asp Gly Leu Lys Asn Glu Gly Leu Lys Glu Lys Ile Asp Ala Ala Lys 120 125 Lys Cys Ser Glu Thr Phe Thr Asn Lys Leu Lys Glu Lys His Thr Asp 135

Leu Gly Lys	Glu Glv	Val Thr	Asp Ala	Asp Ala	Lvs Glu	Ala Tle	Leu	
145	_	150	_	155	_		160	
Lys Ala Asn	GIY Thr 165	Lys Thr	ras era	7 Ala Glu 170	Glu Leu	GLy Ly:	_	
Phe Glu Ser	Val Glu 180	Val Leu	Ser Lys		Lys Glu	Met Le	ı Ala	
Asn Ser Val		Leu Thr	Ser Pro				Lys	
195 Lys Pro			200		205			
210								
<210> 45								
<211> 580								
<212> DNA <213> Borre	lia burg	dorferi						
<220>								
<221> CDS <222> (1)	(500)							
, ,	. (300)							
<400> 45 atg gct tgt	aat aat	tca ggg	aaa gat	ggg aat	aca tct	gca aa	tct 48	
Met Ala Cys							n Ser	
			1					
gct gat gag Ala Asp Glu			Pro Asr	Leu Thr		Asn Ly		
	20		25	i		30		
att acg gat Ile Thr Asp	tct aat	gcg gtt	tta ctt	gct gtg	aaa gag	gtt gaa	a gcg 144	
35	Jei Asii	Ala val	40	Ala vai	45	var or	u	
ttg ctg tca								
Leu Leu Ser 50	Ser Ile	Asp Glu 55		Ala Lys	Ala Ile 60	Gly Ly:	s Lys	
ata cac caa	aat aat	aat tta	gat acc	· daa aat	aat cac	aat qq	a tca 240	
Ile His Gln		Gly Leu		Glu Asn			y Ser	
65		70		75			80	
ttg tta gcg Leu Leu Ala								
	85	-1		90		9:		
gat gga ttg								
Asp Gly Leu	Lys Asn 100	Glu Gly	Leu Lys		Ile Asp	Ala Ala 110	a Lys	
aaa tgt tct	gaa aca	ttt act	aat aaa	tta aaa	gaa aaa	cac aca	a gat 384	
Lys Cys Ser			Asn Lys		Glu Lys		,	
115			120		125			
ctt ggt aaa Leu Gly Lys								
130	•	135		-	140			

aaa gca aat ggt act aaa act aaa ggt gct gaa gaa ctt gga aaa tta Lys Ala Asn Gly Thr Lys Thr Lys Gly Ala Glu Glu Leu Gly Lys Leu 145 150 155 160	480
ttt gaa tca gta gag gtc ttg tca aaa gca gct aaa gag atg ctt gct Phe Glu Ser Val Glu Val Leu Ser Lys Ala Ala Lys Glu Met Leu Ala 165 170 175	528
aat tca gtt aaa gag ctt aca agc cct gtt gtg gca gaa agt cca tcc Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu Ser Pro Ser 180 185 190	576
atg g Met	580
<210> 46 <211> 193 <212> PRT <213> Borrelia burgdorferi	
<pre>&lt;400&gt; 46 Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser 1 5 10 15</pre>	
Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Asn Lys Lys 20 25 30	
Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala 35 40 45	
Leu Leu Ser Ser Ile Asp Glu Ile Ala Ala Lys Ala Ile Gly Lys Lys 50 55 60	
Ile His Gln Asn Asn Gly Leu Asp Thr Glu Asn Asn His Asn Gly Ser 65 70 75 80	
Leu Leu Ala Gly Ala Tyr Ala Ile Ser Thr Leu Ile Lys Gln Lys Leu  85 90 95	
Asp Gly Leu Lys Asn Glu Gly Leu Lys Glu Lys Ile Asp Ala Ala Lys	
Lys Cys Ser Glu Thr Phe Thr Asn Lys Leu Lys Glu Lys His Thr Asp	
Leu Gly Lys Glu Gly Val Thr Asp Ala Asp Ala Lys Glu Ala Ile Leu 130 135 140	
Lys Ala Asn Gly Thr Lys Thr Lys Gly Ala Glu Glu Leu Gly Lys Leu	
Phe Glu Ser Val Glu Val Leu Ser Lys Ala Ala Lys Glu Met Leu Ala	
165 170 175  Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu Ser Pro Ser	
180 185 190 Met	
<210> 47 <211> 639	
<212> DNA <213> Borrelia garinii	

	L> CI	os L)	. (639	9)												
atg		aag			tta Leu											48
					tca Ser											96
					gcg Ala											144
					aat Asn											192
					ata Ile 70											240
					aat Asn											288
					gcc Ala											336
ttg Leu	agt Ser	aaa Lys 115	ttg Leu	aaa Lys	aat Asn	tta Leu	gaa Glu 120	gaa Glu	tta Leu	aag Lys	aca Thr	gaa Glu 125	att Ile	gca Ala	aag Lys	384
					gaa Glu											432
gca Ala 145	gat Asp	ctt Leu	ggc Gly	aaa Lys	cag Gln 150	gat Asp	gct Ala	acc Thr	gat Asp	gat Asp 155	cat His	gca Ala	aaa Lys	gca Ala	gct Ala 160	480
					gca Ala											528
				tca	gta Val				tta					gta		576
					aaa Lys											624
cca	aaa	aaa	cct	taa												639

```
Pro Lys Lys Pro *
   210
<210> 48
<211> 212
<212> PRT
<213> Borrelia garinii
<400> 48
Met Lys Lys Asn Thr Leu Ser Ala Ile Leu Met Thr Leu Phe Leu Phe
Ile Ser Cys Ser Asn Ser Gly Lys Gly Gly Asp Ser Ala Ser Thr Asn
Pro Ala Asp Glu Ser Ala Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys
                            40
Lys Ile Thr Asp Ser Asn Ala Phe Val Leu Ala Val Lys Glu Val Glu
                        55
Thr Leu Val Leu Ser Ile Asp Glu Leu Ala Lys Lys Ala Ile Gly Gln
                    70
                                        75
Lys Ile Asp Asn Asn Gly Leu Ala Ala Leu Asn Asn Gln Asn Gly
                                    90
Ser Leu Leu Ala Gly Ala Tyr Ala Ile Ser Thr Leu Ile Thr Glu Lys
                                105
Leu Ser Lys Leu Lys Asn Leu Glu Glu Leu Lys Thr Glu Ile Ala Lys
                            120
Ala Lys Lys Cys Ser Glu Glu Phe Thr Asn Lys Leu Lys Ser Gly His
                        135
                                            140
Ala Asp Leu Gly Lys Gln Asp Ala Thr Asp Asp His Ala Lys Ala Ala
                    150
                                        155
Ile Leu Lys Thr His Ala Thr Thr Asp Lys Gly Ala Lys Glu Phe Lys
                                    170
                                                        175
Asp Leu Phe Glu Ser Val Glu Gly Leu Leu Lys Ala Ala Gln Val Ala
                                185
                                                   190
Leu Thr Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu Ser
                                                205
       195
                            200
Pro Lys Lys Pro
   210
<210> 49
<211> 624
<212> DNA
<213> Borrelia afzelii
<220>
<221> CDS
<222> (1)...(624)
<400> 49
atg aaa aag aat aca tta agt gcg ata tta atg act tta ttt tta ttt
                                                                   48
Met Lys Lys Asn Thr Leu Ser Ala Ile Leu Met Thr Leu Phe Leu Phe
                                     10
ata tct tgt aat aat tca ggt ggg gat tct gca tct act aat cct gat
Ile Ser Cys Asn Asn Ser Gly Gly Asp Ser Ala Ser Thr Asn Pro Asp
```

									gta Val							144
									aaa Lys							192
									att Ile							240
									cga Arg 90							288
									aca Thr							336
aat Asn	tca Ser	gaa Glu 115	gaa Glu	tta Leu	aag Lys	aaa Lys	aaa Lys 120	att Ile	aaa Lys	gag Glu	gct Ala	aag Lys 125	gat Asp	tgt Cys	tcc Ser	384
									agt Ser							432
caa Gln 145	agc Ser	gtt Val	cag Gln	gat Asp	gat Asp 150	aat Asn	gca Ala	aaa Lys	aaa Lys	gct Ala 155	att Ile	tta Leu	aaa Lys	aca Thr	cat His 160	480
gga Gly	act Thr	aaa Lys	gac Asp	aag Lys 165	ggt Gly	gct Ala	aaa Lys	gaa Glu	ctt Leu 170	gaa Glu	gag Glu	tta Leu	ttt Phe	aaa Lys 175	tca Ser	528
cta Leu	gaa Glu	agc Ser	ttg Leu 180	tca Ser	aaa Lys	gca Ala	gcg Ala	caa Gln 185	gca Ala	gca Ala	tta Leu	act Thr	aat Asn 190	tca Ser	gtt Val	576
									gaa Glu						taa *	624
<21:	0> 50 1> 20 2> PI 3> Bo	07 RT	lia a	afze:	lii											
	0> 50 Lys		Asn	Thr	Leu	Ser	Ala	Ile	Leu	Met	Thr	Leu	Phe	Leu	Phe	
1 Ile	Ser	Cys	Asn 20	5 Asn	Ser	Gly	Gly	Asp 25	10 Ser	Ala	Ser	Thr	Asn 30	15 Pro	Asp	

Glu	Ser	Ala 35	Lys	Gly	Pro	Asn	Leu 40	Thr	Val	Ile	Ser	Lys 45	Lys	Ile	Thr	
Asp	Ser 50	Asn	Ala	Phe	Leu	Leu 55	Ala	Val	Lys	Glu	Val 60	Glu	Ala	Leu	Leu	
Ser 65	Ser	Ile	Asp	Glu	Leu 70	Ser	Lys	Ala	Ile	Gly 75	Lys	Lys	Ile	Lys	Asn 80	
Asp	Gly	Thr	Leu	Asp 85	Asn	Glu	Ala	Asn	Arg 90	Asn	Glu	Ser	Leu	Ile 95		
Gly	Ala	Tyr	Glu 100		Ser	Lys	Leu	Ile 105		Gln	Lys	Leu	Ser 110		Leu	
Asn	Ser	Glu 115		Leu	Lys	Lys	Lys 120		Lys	Glu	Ala	Lys 125		Cys	Ser	
Gln	Lys 130		Thr	Thr	Lys	Leu 135		Asp	Ser	His	Ala 140		Leu	Gly	Ile	
Gln 145		Val	Gln	Asp	Asp 150		Ala	Lys	Lys	Ala 155		Leu	Lys	Thr	His 160	
	Thr	Lys	Asp	Lys 165	Gly	Ala	Lys	Glu	Leu 170		Glu	Leu	Phe	Lys 175		
Leu	Glu	Ser	Leu 180		Lys	Ala	Ala	Gln 185		Ala	Leu	Thr	Asn 190		Val	
Lys	Glu	Leu 195		Asn	Pro	Val	Val 200		Glu	Ser	Pro	Lys 205		Pro		
<212 <212	0> 51 l> 10 2> Di 3> os	680	Chime	era												
	l> CI	os L)	. (168	30)												
	0> 50															
					tca Ser											48
					aaa Lys											96
att Ile	acg Thr	gat Asp 35	tct Ser	aat Asn	gcg Ala	gtt Val	tta Leu 40	ctt Leu	gct Ala	gtg Val	aaa Lys	gag Glu 45	gtt Val	gaa Glu	gcg Ala	144
_	_				gat Asp	_		-	-		-					192

						gca Ala										288
						gga Gly									_	336
						act Thr										384
						act Thr 135										432
						act Thr										480
						ttg Leu										528
aat Asn	tca Ser	gtt Val	aaa Lys 180	gag Glu	ctt Leu	aca Thr	agc Ser	cct Pro 185	gtt Val	gtg Val	gca Ala	gaa Glu	agt Ser 190	cca Pro	gcc Ala	576
atg Met	ggt Gly	agt Ser 195	aat Asn	tca Ser	ggg Gly	aaa Lys	ggt Gly 200	ggg Gly	gat Asp	tct Ser	gca Ala	tct Ser 205	act Thr	aat Asn	cct Pro	624
gct Ala	gac Asp 210	gag Glu	tct Ser	gcg Ala	aaa Lys	ggg Gly 215	cct Pro	aat Asn	ctt Leu	aca Thr	gaa Glu 220	ata Ile	agc Ser	aaa Lys	aaa Lys	672
						ttt Phe										720
						gaa Glu										768
						tta Leu										816
ttg Leu	tta Leu	gca Ala 275	gga Gly	gcc Ala	tat Tyr	gca Ala	ata Ile 280	tca Ser	acc Thr	cta Leu	ata Ile	aca Thr 285	gaa Glu	aaa Lys	ttg Leu	864
agt Ser	aaa Lys 290	ttg Leu	aaa Lys	aat Asn	tta Leu	gaa Glu 295	gaa Glu	tta Leu	aag Lys	aca Thr	gaa Glu 300	att Ile	gca Ala	aag Lys	gct Ala	912

													ggt Gly			960
													gca Ala			1008
													ttt Phe 350			1056
													gta Val			1104
													ggt Gly			1152
													aat Asn			1200
													ctg Leu			1248
aaa Lys	gaa Glu	gtt Val	gag Glu 420	gct Ala	ttg Leu	ctt Leu	tca Ser	tct Ser 425	ata Ile	gat Asp	gaa Glu	ctt Leu	tct Ser 430	aaa Lys	gct Ala	1296
att Ile	ggt Gly	aaa Lys 435	aaa Lys	ata Ile	aaa Lys	aat Asn	gat Asp 440	ggt Gly	act Thr	tta Leu	gat Asp	aac Asn 445	gaa Glu	gca Ala	aat Asn	1344
cga Arg	aac Asn 450	gaa Glu	tca Ser	ttg Leu	ata Ile	gca Ala 455	gga Gly	gct Ala	tat Tyr	gaa Glu	ata Ile 460	tca Ser	aaa Lys	cta Leu	ata Ile	1392
													aaa Lys			1440
													cta Leu			1488
													aat Asn 510			1536

			gga Gly 520							1584
_			cta Leu	_	_	_		_		1632
			aaa Lys							1680

<210> 52 <211> 560 <212> PRT <213> ospC Chimera

<400> 52 Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser 10 Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys 25 Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Ile Ala Ala Lys Ala Ile Gly Lys Lys Ile His Gln Asn Asn Gly Leu Asp Thr Glu Tyr Asn His Asn Gly Ser 70 Leu Leu Ala Gly Ala Tyr Ala Ile Ser Thr Leu Ile Lys Gln Lys Leu 90 Asp Gly Leu Lys Asn Glu Gly Leu Lys Glu Lys Ile Asp Ala Ala Lys 105 110 Lys Cys Ser Glu Thr Phe Thr Asn Lys Leu Lys Glu Lys His Thr Asp 120 Leu Gly Lys Glu Gly Val Thr Asp Ala Asp Ala Lys Glu Ala Ile Leu 135 140 Lys Thr Asn Gly Thr Lys Thr Lys Gly Ala Glu Glu Leu Gly Lys Leu 155 150 Phe Glu Ser Val Glu Val Leu Ser Lys Ala Ala Lys Glu Met Leu Ala 170 Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu Ser Pro Ala 190 180 185 Met Gly Ser Asn Ser Gly Lys Gly Gly Asp Ser Ala Ser Thr Asn Pro 205 195 200 Ala Asp Glu Ser Ala Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys 215 220 Ile Thr Asp Ser Asn Ala Phe Val Leu Ala Val Lys Glu Val Glu Thr 235 230 Leu Val Leu Ser Ile Asp Glu Leu Ala Lys Lys Ala Ile Gly Gln Lys 250 245 Ile Asp Asn Asn Gly Leu Ala Ala Leu Asn Asn Gln Asn Gly Ser 265 260

Leu	Leu	Ala 275	Gly	Ala	Tyr	Ala	Ile 280	Ser	Thr	Leu	Ile	Thr 285	Glu	Lys	Leu	
Ser	Lys 290		Lys	Asn	Leu	Glu 295		Leu	Lys	Thr	Glu 300		Ala	Lys	Ala	
Lys 305		Cys	Ser	Glu	Glu 310		Thr	Asn	Lys	Leu 315		Ser	Gly	His	Ala 320	
Asp	Leu	Gly	Lys	Gln 325	Asp	Ala	Thr	Asp	Asp 330	His	Ala	Lys	Ala	Ala 335		
Leu	Lys	Thr	His 340	Ala	Thr	Thr	Asp	Lys 345	Gly	Ala	Lys	Glu	Phe 350	Lys	Asp	
Leu	Phe	Glu 355	Ser	Val	Glu	Gly	Leu 360	Leu	Lys	Ala	Ala	Gln 365	Val	Ala	Leu	
Thr	Asn 370	Ser	Val	Lys	Glu	Leu 375	Gly	His	Arg	Asn	Asn 380	Ser	Gly	Gly	Asp	
Ser 385	Ala	Ser	Thr	Asn	Pro 390	Asp	Glu	Ser	Ala	Lys 395	Gly	Pro	Asn	Leu	Thr 400	
Val	Ile	Ser	Lys	Lys 405	Ile	Thr	Asp	Ser	Asn 410	Ala	Phe	Leu	Leu	Ala 415	Val	
Lys	Glu	Val	Glu 420	Ala	Leu	Leu	Ser	Ser 425	Ile	Asp	Glu	Leu	Ser 430	Lys	Ala	
Ile	Gly	Lys 435	Lys	Ile	Lys	Asn	Asp 440	Gly	Thr	Leu	Asp	Asn 445	Glu	Ala	Asn	
Arg	Asn 450	Glu	Ser	Leu	Ile	Ala 455	Gly	Ala	Tyr	Glu	Ile 460	Ser	Lys	Leu	Ile	
Thr 465	Gln	Lys	Leu	Ser	Val 470	Leu	Asn	Ser	Glu	Glu 475	Leu	Lys	Lys	Lys	Ile 480	
Lys	Glu	Ala	Lys	Asp 485	Cys	Ser	Gln	Lys	Phe 490	Thr	Thr	Lys	Leu	Lys 495	Asp	
Ser	His	Ala	Glu 500	Leu	Gly	Ile	Gln	Ser 505	Val	Gln	Asp	Asp	Asn 510	Ala	Lys	
Lys	Ala	Ile 515	Leu	Lys	Thr	His	Gly 520	Thr	Lys	Asp	Lys	Gly 525	Ala	Lys	Glu	
Leu	Glu 530	Glu	Leu	Phe	Lys	Ser 535	Leu	Glu	Ser	Leu	Ser 540	Lys	Ala	Ala	Gln	
Ala 545	Ala	Leu	Thr	Asn	Ser 550	Val	Lys	Glu	Leu	Thr 555	Asn	Pro	Val	Val	Ala 560	
<212 <212	0> 5: 1> 1: 2> Di 3> o:	137	Chime	era												
	1> CI	os 1)	.(11	37)												
	0> 5:															
				aat Asn 5												48
				gtt Val												96

att Ile	acg Thr	gat Asp 35	tct Ser	aat Asn	gcg Ala	gtt Val	tta Leu 40	ctt Leu	gct Ala	gtg Val	aaa Lys	gag Glu 45	gtt Val	gaa Glu	gcg Ala	144
					gat Asp											192
aaa Lys 65	aac Asn	gat Asp	ggt Gly	agt Ser	tta Leu 70	gat Asp	aat Asn	gaa Glu	gca Ala	aat Asn 75	cgc Arg	aac Asn	gag Glu	tca Ser	ttg Leu 80	240
					aca Thr											288
					gaa Glu											336
aaa Lys	tgc Cys	tct Ser 115	gaa Glu	gag Glu	ttt Phe	agt Ser	act Thr 120	aaa Lys	cta Leu	aaa Lys	gat Asp	aat Asn 125	cat His	gca Ala	cag Gln	384
ctt Leu	ggt Gly 130	ata Ile	cag Gln	ggc Gly	gtt Val	act Thr 135	gat Asp	gaa Glu	aat Asn	gca Ala	aaa Lys 140	aaa Lys	gct Ala	att Ile	tta Leu	432
aaa Lys 145	gca Ala	aat Asn	gca Ala	gcg Ala	ggt Gly 150	aaa Lys	gat Asp	aag Lys	ggc Gly	gtt Val 155	gaa Glu	gaa Glu	ctt Leu	gaa Glu	aag Lys 160	480
ttg Leu	tcc Ser	gga Gly	tca Ser	tta Leu 165	gaa Glu	agc Ser	tta Leu	tca Ser	aaa Lys 170	gca Ala	gct Ala	aaa Lys	gag Glu	atg Met 175	ctt Leu	528
gct Ala	aat Asn	tca Ser	gtt Val 180	aaa Lys	gag Glu	ctt Leu	aca Thr	agc Ser 185	cct Pro	gtt Val	gtc Val	cat His	ggt Gly 190	aat Asn	aat Asn	576
tca Ser	ggt Gly	ggg Gly 195	Asp	Ser	gca Ala	Ser	Thr	Asn	Pro	Asp	Glu	Ser	Ala	aaa Lys	gga Gly	624
cct Pro	aat Asn 210	ctt Leu	acc Thr	gta Val	ata Ile	agc Ser 215	aaa Lys	aaa Lys	att Ile	aca Thr	gat Asp 220	tct Ser	aat Asn	gca Ala	ttt Phe	672
tta Leu 225	ctg Leu	gct Ala	gtg Val	aaa Lys	gaa Glu 230	gtt Val	gag Glu	gct Ala	ttg Leu	ctt Leu 235	tca Ser	tct Ser	ata Ile	gat Asp	gaa Glu 240	720
ctt																768

											gga Gly					816
								-	_	_	aat Asn		_	-		864
											caa Gln 300					912
									Gly		caa Gln					960
gat Asp	aat Asn	gca Ala	aaa Lys	aaa Lys 325	gct Ala	att Ile	tta Leu	aaa Lys	aca Thr 330	cat His	gga Gly	act Thr	aaa Lys	gac Asp 335	aag Lys	1008
ggt Gly	gct Ala	aaa Lys	gaa Glu 340	ctt Leu	gaa Glu	gag Glu	tta Leu	ttt Phe 345	aaa Lys	tca Ser	cta Leu	gaa Glu	agc Ser 350	ttg Leu	tca Ser	1056
aaa Lys	gca Ala	gcg Ala 355	caa Gln	gca Ala	gca Ala	tta Leu	act Thr 360	aat Asn	tca Ser	gtt Val	aaa Lys	gag Glu 365	ctt Leu	aca Thr	aat Asn	1104
					agt Ser											1137

<210> 54 <211> 378 <212> PRT

<213> ospC Chimera

<400> 54

Met Ala Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser 10 Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys 25 Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala 40 Leu Leu Ser Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile 55 Lys Asn Asp Gly Ser Leu Asp Asn Glu Ala Asn Arg Asn Glu Ser Leu 75 70 Leu Ala Gly Ala Tyr Thr Ile Ser Thr Leu Ile Thr Gln Lys Leu Ser 85 90 Lys Leu Asn Gly Ser Glu Gly Leu Lys Glu Lys Ile Ala Ala Lys 105 100

```
Lys Cys Ser Glu Glu Phe Ser Thr Lys Leu Lys Asp Asn His Ala Gln
                            120
Leu Gly Ile Gln Gly Val Thr Asp Glu Asn Ala Lys Lys Ala Ile Leu
                        135
Lys Ala Asn Ala Ala Gly Lys Asp Lys Gly Val Glu Glu Leu Glu Lys
                    150
                                        155
Leu Ser Gly Ser Leu Glu Ser Leu Ser Lys Ala Ala Lys Glu Met Leu
                                    170
Ala Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val His Gly Asn Asn
                                185
Ser Gly Gly Asp Ser Ala Ser Thr Asn Pro Asp Glu Ser Ala Lys Gly
                            200
Pro Asn Leu Thr Val Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Phe
                        215
                                            220
Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu
                    230
                                        235
Leu Ser Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Gly Thr Leu Asp
                                    250
Asn Glu Ala Asn Arg Asn Glu Ser Leu Ile Ala Gly Ala Tyr Glu Ile
                                265
                                                    270
Ser Lys Leu Ile Thr Gln Lys Leu Ser Val Leu Asn Ser Glu Glu Leu
                            280
Lys Lys Ile Lys Glu Ala Lys Asp Cys Ser Gln Lys Phe Thr Thr
                        295
                                            300
Lys Leu Lys Asp Ser His Ala Glu Leu Gly Ile Gln Ser Val Gln Asp
                    310
                                        315
Asp Asn Ala Lys Lys Ala Ile Leu Lys Thr His Gly Thr Lys Asp Lys
                                    330
                                                        335
Gly Ala Lys Glu Leu Glu Glu Leu Phe Lys Ser Leu Glu Ser Leu Ser
                                345
                                                    350
Lys Ala Ala Gln Ala Ala Leu Thr Asn Ser Val Lys Glu Leu Thr Asn
                            360
                                                365
Pro Val Val Ala Glu Ser Pro Lys Lys Pro
                        375
```

													gtt Val			144
													ggt Gly			192
													aat Asn			240
													caa Gln			288
													gcg Ala 110			336
													cac His			384
ctt Leu	ggt Gly 130	aaa Lys	gaa Glu	ggt Gly	gtt Val	act Thr 135	gat Asp	gct Ala	gat Asp	gca Ala	aaa Lys 140	gaa Glu	gcc Ala	att Ile	tta Leu	432
													gga Gly			480
ttt Phe	gaa Glu	tca Ser	gta Val	gag Glu 165	gtc Val	ttg Leu	tca Ser	aaa Lys	gca Ala 170	gct Ala	aaa Lys	gag Glu	atg Met	ctt Leu 175	gct Ala	528
													agt Ser 190			576
aaa Lys	cct Pro	ttc Phe 195	cat His	ggt Gly	aat Asn	aat Asn	tca Ser 200	ggt Gly	ggg Gly	gat Asp	tct Ser	gca Ala 205	tct Ser	act Thr	aat Asn	624
													agc Ser			672
att Ile 225	aca Thr	gat Asp	tct Ser	aat Asn	gca Ala 230	ttt Phe	tta Leu	ctg Leu	gct Ala	gtg Val 235	aaa Lys	gaa Glu	gtt Val	gag Glu	gct Ala 240	720
													aaa Lys			768

													gaa Glu 270			816
													aaa Lys			864
													gct Ala			912
													gca Ala			960
ggt Gly	ata Ile	caa Gln	agc Ser	gtt Val 325	cag Gln	gat Asp	gat Asp	aat Asn	gca Ala 330	aaa Lys	aaa Lys	gct Ala	att Ile	tta Leu 335	aaa Lys	1008
aca Thr	cat His	gga Gly	act Thr 340	aaa Lys	gac Asp	aag Lys	ggt Gly	gct Ala 345	aaa Lys	gaa Glu	ctt Leu	gaa Glu	gag Glu 350	tta Leu	ttt Phe	1056
aaa Lys	tca Ser	cta Leu 355	gaa Glu	agc Ser	ttg Leu	tca Ser	aaa Lys 360	gca Ala	gcg Ala	caa Gln	gca Ala	gca Ala 365	tta Leu	act Thr	aat Asn	1104
tca Ser	gtt Val 370	aaa Lys	gag Glu	ctt Leu	aca Thr	aat Asn 375	cct Pro	gtt Val	gtg Val	gca Ala	gaa Glu 380	agt Ser	cca Pro	aaa Lys	aaa Lys	1152
cct Pro 385	taa *															1158
<21 <21	0> 50 1> 30 2> P1 3> 00	85	Chim	era												
	0> 5 Ala		Asn	Asn	Ser	Gly	Lys	Asp	Gly	Asn	Thr	Ser	Ala	Asn	Ser	
1			Ser	5				Asn	10				Ser	15		
Ile	Thr	Asp 35	20 Ser	Asn	Ala	Val	Leu 40	25 Leu	Ala	Val	Lys	Glu 45	30 Val	Glu	Ala	
Leu	Leu 50	Ser	Ser	Ile	Asp	Glu 55	Ile	Ala	Ala	Lys	Ala 60	Ile	Gly	Lys	Lys	
65	His				70	Leu				75			Asn		80	
Leu	Leu	Ala	Gly	Ala 85	Tyr	Ala	Ile	Ser	Thr 90	Leu	Ile	Lys	Gln	Lys 95	Leu	

```
Asp Gly Leu Lys Asn Glu Gly Leu Lys Glu Lys Ile Asp Ala Ala Lys
           100
                                105
Lys Cys Ser Glu Thr Phe Thr Asn Lys Leu Lys Glu Lys His Thr Asp
                            120
Leu Gly Lys Glu Gly Val Thr Asp Ala Asp Ala Lys Glu Ala Ile Leu
                        135
Lys Thr Asn Gly Thr Lys Thr Lys Gly Ala Glu Glu Leu Gly Lys Leu
                    150
                                        155
Phe Glu Ser Val Glu Val Leu Ser Lys Ala Ala Lys Glu Met Leu Ala
                165
                                    170
Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu Ser Pro Lys
           180
                                185
Lys Pro Phe His Gly Asn Asn Ser Gly Gly Asp Ser Ala Ser Thr Asn
       195
                            200
                                                205
Pro Asp Glu Ser Ala Lys Gly Pro Asn Leu Thr Val Ile Ser Lys Lys
                        215
                                            220
Ile Thr Asp Ser Asn Ala Phe Leu Leu Ala Val Lys Glu Val Glu Ala
                   230
                                        235
Leu Leu Ser Ser Ile Asp Glu Leu Ser Lys Ala Ile Gly Lys Lys Ile
                245
                                    250
Lys Asn Asp Gly Thr Leu Asp Asn Glu Ala Asn Arg Asn Glu Ser Leu
           260
                                265
Ile Ala Gly Ala Tyr Glu Ile Ser Lys Leu Ile Thr Gln Lys Leu Ser
                            280
                                                285
Val Leu Asn Ser Glu Glu Leu Lys Lys Lys Ile Lys Glu Ala Lys Asp
                                            300
                        295
Cys Ser Gln Lys Phe Thr Thr Lys Leu Lys Asp Ser His Ala Glu Leu
                    310
                                       315
Gly Ile Gln Ser Val Gln Asp Asp Asn Ala Lys Lys Ala Ile Leu Lys
                325
                                   330
Thr His Gly Thr Lys Asp Lys Gly Ala Lys Glu Leu Glu Leu Phe
           340
                                345
Lys Ser Leu Glu Ser Leu Ser Lys Ala Ala Gln Ala Ala Leu Thr Asn
                                               365
                           360
Ser Val Lys Glu Leu Thr Asn Pro Val Val Ala Glu Ser Pro Lys Lys
                        375
    370
Pro
385
<210> 57
<211> 1161
<212> DNA
<213> ospC Chimera
<220>
<221> CDS
<222> (1)...(1161)
<400> 57
atg tgt agt aat tca ggg aaa ggt ggg gat tct gca tct act aat cct
Met Cys Ser Asn Ser Gly Lys Gly Gly Asp Ser Ala Ser Thr Asn Pro
```

						ggg Gly										96
						ttt Phe										144
						gaa Glu 55										192
						tta Leu										240
						gca Ala										288
agt Ser	aaa Lys	ttg Leu	aaa Lys 100	aat Asn	tta Leu	gaa Glu	gaa Glu	tta Leu 105	aag Lys	aca Thr	gaa Glu	att Ile	gca Ala 110	aag Lys	gct Ala	336
aag Lys	aaa Lys	tgt Cys 115	tcc Ser	gaa Glu	gaa Glu	ttt Phe	act Thr 120	aat Asn	aaa Lys	cta Leu	aaa Lys	agt Ser 125	ggt Gly	cat His	gca Ala	384
gat Asp	ctt Leu 130	ggc Gly	aaa Lys	cag Gln	gat Asp	gct Ala 135	acc Thr	gat Asp	gat Asp	cat His	gca Ala 140	aaa Lys	gca Ala	gct Ala	att Ile	432
						acc Thr										480
tta Leu	ttt Phe	gaa Glu	tca Ser	gta Val 165	gaa Glu	ggt Gly	ttg Leu	tta Leu	aaa Lys 170	gca Ala	gct Ala	caa Gln	gta Val	gca Ala 175	cta Leu	528
act Thr	aat Asn	tca Ser	gtt Val 180	aaa Lys	gaa Glu	ctt Leu	aca Thr	agt Ser 185	cct Pro	gtt Val	gta Val	gca Ala	gaa Glu 190	agt Ser	cca Pro	576
aaa Lys	aaa Lys	cct Pro 195	cat His	atg Met	gct Ala	aat Asn	aat Asn 200	tca Ser	ggt Gly	ggg Gly	gat Asp	tct Ser 205	gca Ala	tct Ser	act Thr	624
aat Asn	cct Pro 210	gat Asp	gag Glu	tct Ser	gca Ala	aaa Lys 215	gga Gly	cct Pro	aat Asn	ctt Leu	acc Thr 220	gta Val	ata Ile	agc Ser	aaa Lys	672
aaa Lys 225	att Ile	aca Thr	gat Asp	tct Ser	aat Asn 230	gca Ala	ttt Phe	tta Leu	ctg Leu	gct Ala 235	gtg Val	aaa Lys	gaa Glu	gtt Val	gag Glu 240	720

														aaa Lys 255		768
														gaa Glu		816
														aaa Lys		864
														gct Ala		912
														gca Ala		960
														att Ile 335		1008
														gag Glu		1056
														tta Leu		1104
aat Asn	tca Ser 370	gtt Val	aaa Lys	gag Glu	ctt Leu	aca Thr 375	aat Asn	cct Pro	gtt Val	gtg Val	gca Ala 380	gaa Glu	agt Ser	cca Pro	aaa Lys	1152
aaa Lys 385	cct Pro	taa *														1161
<211 <212	0> 58 1> 38 2> PI 3> os	36 RT	Chime	era												
	)> 58 Cvs		Asn	Ser	Glv	Lvs	Glv	Glv	Asp	Ser	Ala	Ser	Thr	Asn	Pro	
1	_			5	_				10					15 Lys		
		Asp	20				Val	25				Glu	30	Glu		
Leu	Val 50	35 Leu	Ser	Ile	Asp	Glu 55	40 Leu	Ala	Lys	Lys	Ala 60	45 Ile	Gly	Gln	Lys	

```
Ile Asp Asn Asn Asn Gly Leu Ala Ala Leu Asn Asn Gln Asn Gly Ser
Leu Leu Ala Gly Ala Tyr Ala Ile Ser Thr Leu Ile Thr Glu Lys Leu
               85
                                   90
Ser Lys Leu Lys Asn Leu Glu Glu Leu Lys Thr Glu Ile Ala Lys Ala
           100
                               105
Lys Lys Cys Ser Glu Glu Phe Thr Asn Lys Leu Lys Ser Gly His Ala
                          120
                                              125
Asp Leu Gly Lys Gln Asp Ala Thr Asp Asp His Ala Lys Ala Ala Ile
                       135
Leu Lys Thr His Ala Thr Thr Asp Lys Gly Ala Lys Glu Phe Lys Asp
                                       155
                   150
Leu Phe Glu Ser Val Glu Gly Leu Leu Lys Ala Ala Gln Val Ala Leu
                                  170
               165
Thr Asn Ser Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu Ser Pro
           180
                              185
Lys Lys Pro His Met Ala Asn Asn Ser Gly Gly Asp Ser Ala Ser Thr
                                              205
       195
                          200
Asn Pro Asp Glu Ser Ala Lys Gly Pro Asn Leu Thr Val Ile Ser Lys
           215
                                          220
Lys Ile Thr Asp Ser Asn Ala Phe Leu Leu Ala Val Lys Glu Val Glu
               230
                                      235
Ala Leu Leu Ser Ser Ile Asp Glu Leu Ser Lys Ala Ile Gly Lys Lys
                                  250
               245
Ile Lys Asn Asp Gly Thr Leu Asp Asn Glu Ala Asn Arg Asn Glu Ser
                              265
           260
Leu Ile Ala Gly Ala Tyr Glu Ile Ser Lys Leu Ile Thr Gln Lys Leu
                           280
Ser Val Leu Asn Ser Glu Glu Leu Lys Lys Ile Lys Glu Ala Lys
                      295
Asp Cys Ser Gln Lys Phe Thr Thr Lys Leu Lys Asp Ser His Ala Glu
                                      315
                   310
Leu Gly Ile Gln Ser Val Gln Asp Asp Asn Ala Lys Lys Ala Ile Leu
                                   330
               325
Lys Thr His Gly Thr Lys Asp Lys Gly Ala Lys Glu Leu Glu Glu Leu
                              345
           340
Phe Lys Ser Leu Glu Ser Leu Ser Lys Ala Ala Gln Ala Ala Leu Thr
       355
                          360
Asn Ser Val Lys Glu Leu Thr Asn Pro Val Val Ala Glu Ser Pro Lys
                       375
  370
Lys Pro
385
<210> 59
<211> 1197
<212> DNA
<213> ospC Chimera
<220>
<221> CDS
<222> (1)...(1197)
```

<400> 59																
	aga Arg															48
	caa Gln															96
	ggg Gly															144
	ctt Leu 50															192
	gct Ala															240
gct Ala	gct Ala	aaa Lys	gct Ala	att Ile 85	ggt Gly	aaa Lys	aaa Lys	ata Ile	cac His 90	caa Gln	aat Asn	aat Asn	ggt Gly	ttg Leu 95	gat Asp	288
acc Thr	gaa Glu	tat Tyr	aat Asn 100	cac His	aat Asn	gga Gly	tca Ser	ttg Leu 105	tta Leu	gcg Ala	gga Gly	gct Ala	tat Tyr 110	gca Ala	ata Ile	336
tca Ser	acc Thr	cta Leu 115	ata Ile	aaa Lys	caa Gln	aaa Lys	tta Leu 120	gat Asp	gga Gly	ttg Leu	aaa Lys	aat Asn 125	gaa Glu	gga Gly	tta Leu	384
aag Lys	gaa Glu 130	aaa Lys	att Ile	gat Asp	gcg Ala	gct Ala 135	aag Lys	aaa Lys	tgt Cys	tct Ser	gaa Glu 140	aca Thr	ttt Phe	act Thr	aat Asn	432
aaa Lys 145	tta Leu	aaa Lys	gaa Glu	aaa Lys	cac His 150	aca Thr	gat Asp	ctt Leu	ggt Gly	aaa Lys 155	gaa Glu	ggt Gly	gtt Val	act Thr	gat Asp 160	480
gct Ala	gat Asp	gca Ala	aaa Lys	gaa Glu 165	gcc Ala	att Ile	tta Leu	aaa Lys	aca Thr 170	aat Asn	ggt Gly	act Thr	aaa Lys	act Thr 175	aaa Lys	528
ggt Gly	gct Ala	gaa Glu	gaa Glu 180	ctt Leu	gga Gly	aaa Lys	tta Leu	ttt Phe 185	gaa Glu	tca Ser	gta Val	gag Glu	gtc Val 190	ttg Leu	tca Ser	576
aaa Lys	gca Ala	gct Ala 195	aaa Lys	gag Glu	atg Met	ctt Leu	gct Ala 200	aat Asn	tca Ser	gtt Val	aaa Lys	gag Glu 205	ctt Leu	aca Thr	agc Ser	624

cct Pro	gtt Val 210	gtg Val	gca Ala	gaa Glu	agt Ser	cca Pro 215	gcc Ala	atg Met	gta Val	aat Asn	aat Asn 220	tca Ser	Gly ggg	aaa Lys	gat Asp	672
								gat Asp								720
								aca Thr								768
								ctt Leu 265								816
aaa Lys	gct Ala	att Ile 275	ggt Gly	aaa Lys	aaa Lys	ata Ile	aaa Lys 280	aac Asn	gat Asp	gtt Val	agt Ser	tta Leu 285	gat Asp	aat Asn	gag Glu	864
								tca Ser								912
tta Leu 305	ata Ile	aca Thr	aaa Lys	aaa Lys	ata Ile 310	agt Ser	gca Ala	ata Ile	aaa Lys	gat Asp 315	tca Ser	gga Gly	gaa Glu	ttg Leu	aag Lys 320	960
gca Ala	gaa Glu	att Ile	gaa Glu	aag Lys 325	gct Ala	aag Lys	aaa Lys	tgt Cys	tct Ser 330	gaa Glu	gaa Glu	ttt Phe	act Thr	gct Ala 335	aaa Lys	1008
Leu	Lys	Gly	Glu 340	His	Thr	Asp	Leu	ggt Gly 345	Lys	Glu	Gly	Val	Thr 350	Asp	Asp	1056
Asn	Ala	Lys 355	Lys	Ala	Ile	Leu	Lys 360	aca Thr	Asn	Asn	Asp	Lys 365	Thr	Lys	Gly	1104
gct Ala	gat Asp 370	gaa Glu	ctt Leu	gaa Glu	aag Lys	tta Leu 375	ttt Phe	gaa Glu	tca Ser	gta Val	aaa Lys 380	aac Asn	ttg Leu	tca Ser	aaa Lys	1152
gca Ala 385	Ala	aaa Lys	gag Glu	atg Met	ctt Leu 390	act Thr	aat Asn	tca Ser	gtt Val	aaa Lys 395	gag Glu	ctt Leu	aca Thr	agc Ser		1197

<210> 60

<211> 399 <212> PRT <213> ospC Chimera

<400> 60 Met Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys															
Met 1	Arg	Leu	Leu	Ile 5	Gly	Phe	Ala	Leu	Ala 10	Leu	Ala	Leu	Ile	Gly 15	Cys
Ala	Gln	Lys	Gly 20	Ala	Glu	Ser	Ile	Gly 25	Ser	Суѕ	Asn	Asn	Ser 30	Gly	Lys
Asp	Gly	Asn 35	Thr	Ser	Ala	Asn	Ser 40	Ala	Asp	Glu	Ser	Val 45	Lys	Gly	Pro
Asn	Leu 50	Thr	Glu	Ile	Ser	Lys 55	Lys	Ile	Thr	Asp	Ser 60	Asn	Ala	Val	Leu
65			_		70					75		Ile	_		80
				85					90			Asn		95	
		_	100			_		105				Ala	110		
		115		-		_	120	_				Asn 125			
	130					135					140	Thr			
145		_		_	150					155		Gly			160
	_		_	165					170			Thr		175	
_			180					185				Glu	190		
_		195					200					Glu 205			
	210					215					220	Ser			
Gly 225	Asn	Thr	Ser	Ala	Asn 230	Ser	Ala	Asp	Glu	Ser 235	Val	Lys	Gly	Pro	Asn 240
				245					250			Ala		255	
		_	260					265				Asp	270		
-		275	_	_	_		280					Leu 285			
	290					295					300	Leu			
305			_	_	310					315		Gly			320
				325					330			Phe		335	
	_	_	340					345				Val	350		
		355	_				360					Lys 365			
	370					375					380	Asn			Lys
Ala 385	Ala	Lys	Glu	Met	Leu 390	Thr	Asn	Ser	Val	Lys 395	Glu	Leu	Thr	Ser	

<210> 61 <211> 1196 <212> DNA

<213> ospC Chimera													
<220> <221> CDS <222> (1)(1196)													
<400> 61 atg aga tta tt Met Arg Leu Le 1													
gca caa aaa gg Ala Gln Lys Gl 2													
gat ggg aat ac Asp Gly Asn Th 35													
aat ctt aca ga Asn Leu Thr Gl 50	a ata agt a u Ile Ser I	aa aaa att ys Lys Ile 55	acg gat tct Thr Asp Ser 60	aat gcg gtt Asn Ala Val	tta 192 Leu								
ctt gct gtg aa Leu Ala Val Ly 65	a gag gtt g s Glu Val G 70	aa gcg ttg lu Ala Leu	ctg tca tct Leu Ser Ser 75	ata gat gaa Ile Asp Glu	att 240 Ile 80								
gct gct aaa gc Ala Ala Lys Al	t att ggt a a Ile Gly I 85	aa aaa ata ys Lys Ile	cac caa aat His Gln Asn 90	aat ggt ttg Asn Gly Leu 95	Asp								
acc gaa tat aa Thr Glu Tyr As 10	sn His Asn G												
tca acc cta at Ser Thr Leu II 115	a aaa caa a e Lys Gln I	aaa tta gat Lys Leu Asp 120	gga ttg aaa Gly Leu Lys	aat gaa gga Asn Glu Gly 125	tta 384 Leu								
aag gaa aaa at Lys Glu Lys II 130	e Asp Ala A	gct aag aaa Ala Lys Lys .35	tgt tct gaa Cys Ser Glu 140	aca ttt act Thr Phe Thr	aat 432 Asn								
aaa tta aaa ga Lys Leu Lys Gi 145	aa aaa cac a lu Lys His T 150	ica gat ctt 'hr Asp Leu	ggt aaa gaa Gly Lys Glu 155	ggt gtt act Gly Val Thr	gat 480 Asp 160								
gct gat gca aa Ala Asp Ala L	aa gaa gcc a ys Glu Ala 1 165	att tta aaa Ile Leu Lys	aca aat ggt Thr Asn Gly 170	act aaa act Thr Lys Thr 175	Lys								
ggt gct gaa ga Gly Ala Glu G 18	aa ctt gga a lu Leu Gly I 30	aaa tta ttt Lys Leu Phe 185	gaa tca gta Glu Ser Val	gag gtc ttg Glu Val Leu 190	tca 576 Ser								

							gct Ala 200									624
							gcc Ala									672
							gct Ala									720
							att Ile									768
gct Ala	gtg Val	aaa Lys	gaa Glu 260	att Ile	gaa Glu	act Thr	ttg Leu	ctt Leu 265	gca Ala	tct Ser	ata Ile	gat Asp	gaa Glu 270	ctt Leu	gct Ala	816
							ata Ile 280									864
							ttg Leu									912
aaa Lys 305	cta Leu	ata Ile	aca Thr	caa Gln	aaa Lys 310	tta Leu	gat Asp	gga Gly	ttg Leu	aaa Lys 315	aat Asn	tca Ser	gaa Glu	aaa Lys	tta Leu 320	960
aag Lys	gaa Glu	aaa Lys	att Ile	gaa Glu 325	aat Asn	gct Ala	aag Lys	aaa Lys	tgt Cys 330	tct Ser	gaa Glu	gat Asp	ttt Phe	act Thr 335	aaa Lys	1008
aaa Lys	cta Leu	gaa Glu	gga Gly 340	gaa Glu	cat His	gcg Ala	caa Gln	ctt Leu 345	gga Gly	att Ile	gaa Glu	aat Asn	gtt Val 350	act Thr	gat Asp	1056
							tta Leu 360									1104
							cta Leu									1152
aaa Lys 385	gca Ala	gct Ala	aaa Lys	gag Glu	atg Met 390	ctt Leu	gct Ala	aat Asn	tca Ser	gtt Val 395	aaa Lys	gag Glu	ctt Leu	ac		1196

<210> 62 <211> 398

<212> PRT <213> ospC Chimera

<400> 62 Met Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Ile Ala Ala Lys Ala Ile Gly Lys Lys Ile His Gln Asn Asn Gly Leu Asp Thr Glu Tyr Asn His Asn Gly Ser Leu Leu Ala Gly Ala Tyr Ala Ile 105 Ser Thr Leu Ile Lys Gln Lys Leu Asp Gly Leu Lys Asn Glu Gly Leu 120 Lys Glu Lys Ile Asp Ala Ala Lys Lys Cys Ser Glu Thr Phe Thr Asn 135 Lys Leu Lys Glu Lys His Thr Asp Leu Gly Lys Glu Gly Val Thr Asp 150 155 Ala Asp Ala Lys Glu Ala Ile Leu Lys Thr Asn Gly Thr Lys Thr Lys 170 Gly Ala Glu Glu Leu Gly Lys Leu Phe Glu Ser Val Glu Val Leu Ser 185 Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr Ser 200 Pro Val Val Ala Glu Ser Pro Ala Met Val Asn Asn Ser Gly Lys Asp 215 Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn 230 235 Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu 250 Ala Val Lys Glu Ile Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala 265 Thr Lys Ala Ile Gly Lys Lys Ile Gln Gln Asn Gly Gly Leu Ala Val 280 Glu Ala Gly His Asn Gly Thr Leu Leu Ala Gly Ala Tyr Thr Ile Ser 295 300 Lys Leu Ile Thr Gln Lys Leu Asp Gly Leu Lys Asn Ser Glu Lys Leu 315 Lys Glu Lys Ile Glu Asn Ala Lys Lys Cys Ser Glu Asp Phe Thr Lys 330 Lys Leu Glu Gly Glu His Ala Gln Leu Gly Ile Glu Asn Val Thr Asp 345 Glu Asn Ala Lys Lys Ala Ile Leu Ile Thr Asp Ala Ala Lys Asp Lys 365 360 Gly Ala Ala Glu Leu Glu Lys Leu Phe Lys Ala Val Glu Asn Leu Ala 375 380 Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu 390

<211 <212	)> 63 L> 11 2> DN 3> os	L85	Chime	era												
	L> CI	os L)	. (118	35)												
atg		tta			gga Gly											48
					gag Glu											96
					gca Ala											144
aat Asn	ctt Leu 50	aca Thr	gaa Glu	ata Ile	agt Ser	aaa Lys 55	aaa Lys	att Ile	acg Thr	gat Asp	tct Ser 60	aat Asn	gcg Ala	gtt Val	tta Leu	192
ctt Leu 65	gct Ala	gtg Val	aaa Lys	gag Glu	gtt Val 70	gaa Glu	gcg Ala	ttg Leu	ctg Leu	tca Ser 75	tct Ser	ata Ile	gat Asp	gag Glu	ctt Leu 80	240
gct Ala	aaa Lys	gct Ala	att Ile	ggt Gly 85	aaa Lys	aaa Lys	ata Ile	aaa Lys	aac Asn 90	gat Asp	ggt Gly	agt Ser	tta Leu	gat Asp 95	aat Asn	288
gaa Glu	gca Ala	aat Asn	cgc Arg 100	aac Asn	gag Glu	tca Ser	ttg Leu	tta Leu 105	gca Ala	gga Gly	gct Ala	tat Tyr	aca Thr 110	ata Ile	tca Ser	336
acc Thr	tta Leu	ata Ile 115	aca Thr	caa Gln	aaa Lys	tta Leu	agt Ser 120	aaa Lys	tta Leu	aac Asn	gga Gly	tca Ser 125	gaa Glu	ggt Gly	tta Leu	384
aag Lys	gaa Glu 130	aag Lys	att Ile	gcc Ala	gca Ala	gct Ala 135	aag Lys	aaa Lys	tgc Cys	tct Ser	gaa Glu 140	gag Glu	ttt Phe	agt Ser	act Thr	432
aaa Lys 145	cta Leu	aaa Lys	gat Asp	aat Asn	cat His 150	gca Ala	cag Gln	ctt Leu	ggt Gly	ata Ile 155	cag Gln	ggc Gly	gtt Val	act Thr	gat Asp 160	480
gaa Glu	aat Asn	gca Ala	aaa Lys	aaa Lys 165	gct Ala	att Ile	tta Leu	aaa Lys	gca Ala 170	aat Asn	gca Ala	gcg Ala	ggt Gly	aaa Lys 175	gat Asp	528

					ctt Leu											576
					gag Glu											624
					ggt Gly											672
					gag Glu 230											720
					gaa Glu											768
					aca Thr											816
					gat Asp											864
					gga Gly											912
					aaa Lys 310											960
aag Lys	gct Ala	aag Lys	aaa Lys	tgt Cys 325	tct Ser	gaa Glu	gaa Glu	ttt Phe	act Thr 330	gct Ala	aaa Lys	tta Leu	aaa Lys	ggt Gly 335	gaa Glu	1008
					aaa Lys											1056
					aat Asn											1104
					tca Ser											1152
					gtt Val 390											1185

<210> 64

#### 76/108

<211> 395 <212> PRT <213> ospC Chimera <400> 64 Met Arg Leu Ieu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Gly Ser Leu Asp Asn Glu Ala Asn Arg Asn Glu Ser Leu Leu Ala Gly Ala Tyr Thr Ile Ser 105 Thr Leu Ile Thr Gln Lys Leu Ser Lys Leu Asn Gly Ser Glu Gly Leu 120 Lys Glu Lys Ile Ala Ala Ala Lys Lys Cys Ser Glu Glu Phe Ser Thr 135 Lys Leu Lys Asp Asn His Ala Gln Leu Gly Ile Gln Gly Val Thr Asp 150 155 Glu Asn Ala Lys Lys Ala Ile Leu Lys Ala Asn Ala Ala Gly Lys Asp 170 165 Lys Gly Val Glu Glu Leu Glu Lys Leu Ser Gly Ser Leu Glu Ser Leu 185 Ser Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr 200 Ser Pro Val Val His Gly Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser 215 220 Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile 230 235 Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu 250 Val Glu Thr Leu Leu Thr Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly 265 Lys Lys Ile Lys Asn Asp Val Ser Leu Asp Asn Glu Ala Asp His Asn 280 Gly Ser Leu Ile Ser Gly Ala Tyr Leu Ile Ser Asn Leu Ile Thr Lys 295 300 Lys Ile Ser Ala Ile Lys Asp Ser Gly Glu Leu Lys Ala Glu Ile Glu 310 315 Lys Ala Lys Lys Cys Ser Glu Glu Phe Thr Ala Lys Leu Lys Gly Glu 330 His Thr Asp Leu Gly Lys Glu Gly Val Thr Asp Asp Asn Ala Lys Lys 345 Ala Ile Leu Lys Thr Asn Asn Asp Lys Thr Lys Gly Ala Asp Glu Leu 360 Glu Lys Leu Phe Glu Ser Val Lys Asn Leu Ser Lys Ala Ala Lys Glu 375 Met Leu Thr Asn Ser Val Lys Glu Leu Thr Ser 390

<210> 65 <211> 1184 <212> DNA <213> ospC Chimer	ca		
<220> <221> CDS <222> (1)(1184)	1)		
		tta gcg tta gct tta Leu Ala Leu Ala Leu 10	
		gga tcc tgt aat aat Gly Ser Cys Asn Asn 25	
		gct gat gag tct gtt Ala Asp Glu Ser Val 45	
		att acg gat tct aat Ile Thr Asp Ser Asn 60	
ctt gct gtg aaa g Leu Ala Val Lys G 65	gag gtt gaa gcg t Glu Val Glu Ala I 70	ttg ctg tca tct ata Leu Leu Ser Ser Ile 75	gat gag ctt 240 Asp Glu Leu 80
gct aaa gct att o Ala Lys Ala Ile o	ggt aaa aaa ata a Gly Lys Lys Ile I 85	aaa aac gat ggt agt Lys Asn Asp Gly Ser 90	tta gat aat 288 Leu Asp Asn 95
gaa gca aat cgc a Glu Ala Asn Arg A 100	Asn Glu Ser Leu I	tta gca gga gct tat Leu Ala Gly Ala Tyr 105	aca ata tca 336 Thr Ile Ser 110
		aaa tta aac gga tca Lys Leu Asn Gly Ser 125	
aag gaa aag att o Lys Glu Lys Ile A 130	gcc gca gct aag a Ala Ala Lys I 135	aaa tgc tct gaa gag Lys Cys Ser Glu Glu 140	ttt agt act 432 Phe Ser Thr
aaa cta aaa gat a Lys Leu Lys Asp <i>H</i> 145	aat cat gca cag o Asn His Ala Gln I 150	ctt ggt ata cag ggc Leu Gly Ile Gln Gly 155	gtt act gat 480 Val Thr Asp 160
Glu Asn Ala Lys I	aaa gct att tta a Lys Ala Ile Leu I 165	aaa gca aat gca gcg Lys Ala Asn Ala Ala 170	ggt aaa gat 528 Gly Lys Asp 175

					ctt Leu											576
					gag Glu											624
					ggt Gly											672
					gag Glu 230											720
					gaa Glu											768
att Ile	gaa Glu	act Thr	ttg Leu 260	ctt Leu	gca Ala	tct Ser	ata Ile	gat Asp 265	gaa Glu	ctt Leu	gct Ala	act Thr	aaa Lys 270	gct Ala	att Ile	816
ggt Gly	aaa Lys	aaa Lys 275	ata Ile	caa Gln	caa Gln	aat Asn	ggt Gly 280	ggt Gly	tta Leu	gct Ala	gtc Val	gaa Glu 285	gcg Ala	ggg	cat His	864
aat Asn	gga Gly 290	aca Thr	ttg Leu	tta Leu	gca Ala	ggt Gly 295	gct Ala	tat Tyr	aca Thr	ata Ile	tca Ser 300	aaa Lys	cta Leu	ata Ile	aca Thr	912
caa Gln 305	aaa Lys	tta Leu	gat Asp	gga Gly	ttg Leu 310	aaa Lys	aat Asn	tca Ser	gaa Glu	aaa Lys 315	tta Leu	aag Lys	gaa Glu	aaa Lys	att Ile 320	960
gaa Glu	aat Asn	gct Ala	aag Lys	aaa Lys 325	tgt Cys	tct Ser	gaa Glu	gat Asp	ttt Phe 330	act Thr	aaa Lys	aaa Lys	cta Leu	gaa Glu 335	gga Gly	1008
gaa Glu	cat His	gcg Ala	caa Gln 340	ctt Leu	gga Gly	att Ile	gaa Glu	aat Asn 345	gtt Val	act Thr	gat Asp	gag Glu	aat Asn 350	gca Ala	aaa Lys	1056
aaa Lys	gct Ala	att Ile 355	Leu	ata Ile	aca Thr	gat Asp	gca Ala 360	gct Ala	aaa Lys	gat Asp	aag Lys	ggc Gly 365	gct Ala	gca Ala	gag Glu	1104
ctt Leu	gaa Glu 370	aag Lys	cta Leu	ttt Phe	aaa Lys	gca Ala 375	gta Val	gaa Glu	aac Asn	ttg Leu	gca Ala 380	aaa Lys	gca Ala	gct Ala	aaa Lys	1152
	Met				tca Ser 390					ac						1184

<210> 66 <211> 394 <212> PRT <213> ospC Chimera <400> 66 Met Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ile Gly Cys 10 Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys 20 25 Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Leu 70 Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Gly Ser Leu Asp Asn 90 Glu Ala Asn Arg Asn Glu Ser Leu Leu Ala Gly Ala Tyr Thr Ile Ser 100 105 110 Thr Leu Ile Thr Gln Lys Leu Ser Lys Leu Asn Gly Ser Glu Gly Leu 120 125 Lys Glu Lys Ile Ala Ala Ala Lys Lys Cys Ser Glu Glu Phe Ser Thr 135 140 Lys Leu Lys Asp Asn His Ala Gln Leu Gly Ile Gln Gly Val Thr Asp 150 155 Glu Asn Ala Lys Lys Ala Ile Leu Lys Ala Asn Ala Ala Gly Lys Asp 170 Lys Gly Val Glu Glu Leu Glu Lys Leu Ser Gly Ser Leu Glu Ser Leu 185 Ser Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr 200 Ser Pro Val Val His Gly Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser 215 220 Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile 235 230 Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu 250 245 Ile Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile 260 265 Gly Lys Lys Ile Gln Gln Asn Gly Gly Leu Ala Val Glu Ala Gly His 280 Asn Gly Thr Leu Leu Ala Gly Ala Tyr Thr Ile Ser Lys Leu Ile Thr 300 295 Gln Lys Leu Asp Gly Leu Lys Asn Ser Glu Lys Leu Lys Glu Lys Ile 315 310 Glu Asn Ala Lys Lys Cys Ser Glu Asp Phe Thr Lys Lys Leu Glu Gly 330 325 Glu His Ala Gln Leu Gly Ile Glu Asn Val Thr Asp Glu Asn Ala Lys 345 340 Lys Ala Ile Leu Ile Thr Asp Ala Ala Lys Asp Lys Gly Ala Ala Glu 365 360 Leu Glu Lys Leu Phe Lys Ala Val Glu Asn Leu Ala Lys Ala Ala Lys 380 375 Glu Met Leu Ala Asn Ser Val Lys Glu Leu 390

<211 <212	)> 67 .> 11 ?> DN 3> os	.84 IA	Chime	era												
	.> CI		. (118	34)												
atg	)> 67 aga Arg	tta	tta Leu	ata Ile 5	gga Gly	ttt Phe	gct Ala	tta Leu	gcg Ala 10	tta Leu	gct Ala	tta Leu	ata Ile	gga Gly 15	tgt Cys	48
gca Ala	caa Gln	aaa Lys	ggt Gly 20	gct Ala	gag Glu	tca Ser	att Ile	gga Gly 25	tcc Ser	tgt Cys	aat Asn	aat Asn	tca Ser 30	ggg Gly	aaa Lys	96
gat Asp	ggg Gly	aat Asn 35	aca Thr	tct Ser	gca Ala	aat Asn	tct Ser 40	gct Ala	gat Asp	gag Glu	tct Ser	gtt Val 45	aaa Lys	ggg Gly	cct Pro	144
aat Asn	ctt Leu 50	aca Thr	gaa Glu	ata Ile	agt Ser	aaa Lys 55	aaa Lys	att Ile	acg Thr	gat Asp	tct Ser 60	aat Asn	gcg Ala	gtt Val	tta Leu	192
ctt Leu 65	gct Ala	gtg Val	aaa Lys	gag Glu	gtt Val 70	gaa Glu	gcg Ala	ttg Leu	ctg Leu	tca Ser 75	tct Ser	ata Ile	gat Asp	gag Glu	ctt Leu 80	240
gct Ala	aaa Lys	gct Ala	att Ile	ggt Gly 85	aaa Lys	aaa Lys	ata Ile	aaa Lys	aac Asn 90	gat Asp	ggt Gly	agt Ser	tta Leu	gat Asp 95	aat Asn	288
gaa Glu	gca Ala	aat Asn	cgc Arg 100	aac Asn	gag Glu	tca Ser	ttg Leu	tta Leu 105	gca Ala	gga Gly	gct Ala	tat Tyr	aca Thr 110	ata Ile	tca Ser	336
acc Thr	tta Leu	ata Ile 115	aca Thr	caa Gln	aaa Lys	tta Leu	agt Ser 120	aaa Lys	tta Leu	aac Asn	gga Gly	tca Ser 125	gaa Glu	ggt Gly	tta Leu	384
aag Lys	gaa Glu 130	aag Lys	att Ile	gcc Ala	gca Ala	gct Ala 135	aag Lys	aaa Lys	tgc Cys	tct Ser	gaa Glu 140	gag Glu	ttt Phe	agt Ser	act Thr	432
aaa Lys 145	cta Leu	aaa Lys	gat Asp	aat Asn	cat His 150	gca Ala	cag Gln	ctt Leu	ggt Gly	ata Ile 155	cag Gln	ggc Gly	gtt Val	act Thr	gat Asp 160	480
gaa Glu	aat Asn	gca Ala	aaa Lys	aaa Lys 165	gct Ala	att Ile	tta Leu	aaa Lys	gca Ala 170	aat Asn	gca Ala	gcg Ala	ggt Gly	aaa Lys 175	gat Asp	528

											tca Ser					576
											gtt Val					624
											gat Asp 220					672
aca Thr 225	aat Asn	tct Ser	gcc Ala	gat Asp	gag Glu 230	tct Ser	gtt Val	aaa Lys	ggg Gly	cct Pro 235	aat Asn	ctt Leu	aca Thr	gaa Glu	ata Ile 240	720
											ctg Leu					768
gtt Val	gag Glu	acc Thr	tta Leu 260	ctt Leu	gca Ala	tct Ser	ata Ile	gat Asp 265	gaa Glu	ctt Leu	gct Ala	acc Thr	aaa Lys 270	gct Ala	att Ile	816
ggt Gly	aag Lys	aaa Lys 275	ata Ile	ggc Gly	aat Asn	aat Asn	ggt Gly 280	tta Leu	gag Glu	gcc Ala	aat Asn	cag Gln 285	agt Ser	aaa Lys	aac Asn	864
											gac Asp 300					912
aaa Lys 305	tta Leu	aat Asn	gta Val	ttg Leu	aaa Lys 310	aat Asn	gaa Glu	gaa Glu	tta Leu	aag Lys 315	gaa Glu	aag Lys	att Ile	gat Asp	aca Thr 320	960
gct Ala	aag Lys	caa Gln	tgt Cys	tct Ser 325	aca Thr	gaa Glu	ttt Phe	act Thr	aat Asn 330	aaa Lys	cta Leu	aaa Lys	agt Ser	gaa Glu 335	cat His	1008
gca Ala	gtg Val	ctt Leu	ggt Gly 340	ctg Leu	gac Asp	aat Asn	ctt Leu	act Thr 345	gat Asp	gat Asp	aat Asn	gca Ala	caa Gln 350	aga Arg	gct Ala	1056
att Ile	tta Leu	aaa Lys 355	Lys	cat His	gca Ala	aat Asn	aaa Lys 360	gat Asp	aag Lys	ggt Gly	gct Ala	gca Ala 365	Glu	ctt Leu	gaa Glu	1104
aag Lys	tta Leu 370	ttt Phe	aaa Lys	gcg Ala	gta Val	gaa Glu 375	aac Asn	tta Leu	tca Ser	aaa Lys	gca Ala 380	gct Ala	caa Gln	gac Asp	aca Thr	1152
						gag Glu				cc						1184

<210> 68 <211> 394 <212> PRT <213> ospC Chimera <400> 68 Met Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro 40 Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Leu 70 Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Gly Ser Leu Asp Asn 90 Glu Ala Asn Arg Asn Glu Ser Leu Leu Ala Gly Ala Tyr Thr Ile Ser 105 110 Thr Leu Ile Thr Gln Lys Leu Ser Lys Leu Asn Gly Ser Glu Gly Leu 120 Lys Glu Lys Ile Ala Ala Lys Lys Cys Ser Glu Glu Phe Ser Thr Lys Leu Lys Asp Asn His Ala Gln Leu Gly Ile Gln Gly Val Thr Asp 150 155 Glu Asn Ala Lys Lys Ala Ile Leu Lys Ala Asn Ala Ala Gly Lys Asp 170 Lys Gly Val Glu Glu Leu Glu Lys Leu Ser Gly Ser Leu Glu Ser Leu 185 Ser Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr 205 200 Ser Pro Val Val His Gly Asn Asn Ser Arg Lys Asp Gly Asn Ala Ser 215 220 Thr Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile 230 235 Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu 245 250 Val Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile 260 265 Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala Asn Gln Ser Lys Asn 280 Thr Ser Leu Leu Ser Gly Ala Tyr Ala Ile Ser Asp Leu Ile Ala Glu 295 300 Lys Leu Asn Val Leu Lys Asn Glu Glu Leu Lys Glu Lys Ile Asp Thr 310 315 Ala Lys Gln Cys Ser Thr Glu Phe Thr Asn Lys Leu Lys Ser Glu His 325 330 Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp Asn Ala Gln Arg Ala 340 345 Ile Leu Lys Lys His Ala Asn Lys Asp Lys Gly Ala Ala Glu Leu Glu 360 Lys Leu Phe Lys Ala Val Glu Asn Leu Ser Lys Ala Ala Gln Asp Thr 375 Leu Lys Asn Ala Val Lys Glu Leu Thr Ser 390

<210 <211 <212 <213	> 12 > DN	209 IA	Chime	era												
<220 <221 <222	> CE		(120	)9)												
<400% atg a Met A	aga	tta														48
gca ( Ala (																96
gat (	ggg Gly	aat Asn 35	aca Thr	tct Ser	gca Ala	aat Asn	tct Ser 40	gct Ala	gat Asp	gag Glu	tct Ser	gtt Val 45	aaa Lys	ggg Gly	cct Pro	144
aat d Asn ]	ctt Leu 50	aca Thr	gaa Glu	ata Ile	agt Ser	aaa Lys 55	aaa Lys	att Ile	acg Thr	gat Asp	tct Ser 60	aat Asn	gcg Ala	gtt Val	tta Leu	192
ctt d Leu 2 65	gct Ala	gtg Val	aaa Lys	gag Glu	gtt Val 70	gaa Glu	gcg Ala	ttg Leu	ctg Leu	tca Ser 75	tct Ser	ata Ile	gat Asp	gag Glu	ctt Leu 80	240
gct a Ala 1	aaa Lys	gct Ala	att Ile	ggt Gly 85	aaa Lys	aaa Lys	ata Ile	aaa Lys	aac Asn 90	gat Asp	ggt Gly	agt Ser	tta Leu	gat Asp 95	aat Asn	288
gaa ( Glu )	gca Ala	aat Asn	cgc Arg 100	aac Asn	gag Glu	tca Ser	ttg Leu	tta Leu 105	gca Ala	gga Gly	gct Ala	tat Tyr	aca Thr 110	ata Ile	tca Ser	336
acc Thr	tta Leu	ata Ile 115	aca Thr	caa Gln	aaa Lys	tta Leu	agt Ser 120	aaa Lys	tta Leu	aac Asn	gga Gly	tca Ser 125	gaa Glu	ggt Gly	tta Leu	384
aag Lys	gaa Glu 130	aag Lys	att Ile	gcc Ala	gca Ala	gct Ala 135	aag Lys	aaa Lys	tgc Cys	tct Ser	gaa Glu 140	gag Glu	ttt Phe	agt Ser	act Thr	432
aaa Lys 145	cta Leu	aaa Lys	gat Asp	aat Asn	cat His 150	gca Ala	cag Gln	ctt Leu	ggt Gly	ata Ile 155	cag Gln	ggc Gly	gtt Val	act Thr	gat Asp 160	480
gaa Glu	aat Asn	gca Ala	aaa Lys	aaa Lys 165	gct Ala	att Ile	tta Leu	aaa Lys	gca Ala 170	aat Asn	gca Ala	gcg Ala	ggt Gly	aaa Lys 175	gat Asp	528

					ctt Leu											576
tca Ser	aaa Lys	gca Ala 195	gct Ala	aaa Lys	gag Glu	atg Met	ctt Leu 200	gct Ala	aat Asn	tca Ser	gtt Val	aaa Lys 205	gag Glu	ctt Leu	aca Thr	624
					ggt Gly											672
					gca Ala 230											720
					aat Asn											768
gct Ala	ttg Leu	ctt Leu	tca Ser 260	tct Ser	ata Ile	gat Asp	gaa Glu	ctt Leu 265	tct Ser	aaa Lys	gct Ala	att Ile	ggt Gly 270	aaa Lys	aaa Lys	816
ata Ile	aaa Lys	aat Asn 275	gat Asp	ggt Gly	act Thr	tta Leu	gat Asp 280	aac Asn	gaa Glu	gca Ala	aat Asn	cga Arg 285	aac Asn	gaa Glu	tca Ser	864
ttg Leu	ata Ile 290	gca Ala	gga Gly	gct Ala	tat Tyr	gaa Glu 295	ata Ile	tca Ser	aaa Lys	cta Leu	ata Ile 300	aca Thr	caa Gln	aaa Lys	tta Leu	912
agt Ser 305	gta Val	ttg Leu	aat Asn	tca Ser	gaa Glu 310	gaa Glu	tta Leu	aag Lys	aaa Lys	aaa Lys 315	att Ile	aaa Lys	gag Glu	gct Ala	aag Lys 320	960
gat Asp	tgt Cys	tcc Ser	caa Gln	aaa Lys 325	ttt Phe	act Thr	act Thr	aag Lys	cta Leu 330	aaa Lys	gat Asp	agt Ser	cat His	gca Ala 335	gag Glu	1008
ctt Leu	ggt Gly	ata Ile	caa Gln 340	agc Ser	gtt Val	cag Gln	gat Asp	gat Asp 345	aat Asn	gca Ala	aaa Lys	aaa Lys	gct Ala 350	att Ile	tta Leu	1056
aaa Lys	aca Thr	cat His 355	gga Gly	act Thr	aaa Lys	gac Asp	aag Lys 360	ggt Gly	gct Ala	aaa Lys	gaa Glu	ctt Leu 365	gaa Glu	gag Glu	tta Leu	1104
ttt Phe	aaa Lys 370	tca Ser	cta Leu	gaa Glu	agc Ser	ttg Leu 375	tca Ser	aaa Lys	gca Ala	gcg Ala	caa Gln 380	gca Ala	gca Ala	tta Leu	act Thr	1152
aat Asn 385	tca Ser	gtt Val	aaa Lys	gag Glu	ctt Leu 390	Thr	aat Asn	cct Pro	gtt Val	gtg Val 395	Ala	gaa Glu	agt Ser	cca Pro	aaa Lys 400	1200
aaa	cct	taa														1209

Lys Pro \* <210> 70 <211> 402 <212> PRT <213> ospC Chimera <400> 70 Met Arg Leu Ile Gly Phe Ala Leu Ala Leu Ile Gly Cys 10 Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys 20 Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro 40 Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu 55 Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Leu 70 75 Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Gly Ser Leu Asp Asn 90 85 Glu Ala Asn Arg Asn Glu Ser Leu Leu Ala Gly Ala Tyr Thr Ile Ser 100 105 Thr Leu Ile Thr Gln Lys Leu Ser Lys Leu Asn Gly Ser Glu Gly Leu 120 Lys Glu Lys Ile Ala Ala Ala Lys Lys Cys Ser Glu Glu Phe Ser Thr 135 140 Lys Leu Lys Asp Asn His Ala Gln Leu Gly Ile Gln Gly Val Thr Asp 150 155 Glu Asn Ala Lys Lys Ala Ile Leu Lys Ala Asn Ala Ala Gly Lys Asp 170 Lys Gly Val Glu Glu Leu Glu Lys Leu Ser Gly Ser Leu Glu Ser Leu 180 185 Ser Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr 200 Ser Pro Val Val His Gly Asn Asn Ser Gly Gly Asp Ser Ala Ser Thr 220 215 Asn Pro Asp Glu Ser Ala Lys Gly Pro Asn Leu Thr Val Ile Ser Lys 230 235 Lys Ile Thr Asp Ser Asn Ala Phe Leu Leu Ala Val Lys Glu Val Glu 245 250 Ala Leu Leu Ser Ser Ile Asp Glu Leu Ser Lys Ala Ile Gly Lys Lys 260 265 Ile Lys Asn Asp Gly Thr Leu Asp Asn Glu Ala Asn Arg Asn Glu Ser 285 275 280 Leu Ile Ala Gly Ala Tyr Glu Ile Ser Lys Leu Ile Thr Gln Lys Leu 300 295 Ser Val Leu Asn Ser Glu Glu Leu Lys Lys Lys Ile Lys Glu Ala Lys 315 310 Asp Cys Ser Gln Lys Phe Thr Thr Lys Leu Lys Asp Ser His Ala Glu 330 325 Leu Gly Ile Gln Ser Val Gln Asp Asp Asn Ala Lys Lys Ala Ile Leu 340 345 Lys Thr His Gly Thr Lys Asp Lys Gly Ala Lys Glu Leu Glu Glu Leu 360 Phe Lys Ser Leu Glu Ser Leu Ser Lys Ala Ala Gln Ala Ala Leu Thr 375

Asn Ser Val Lys 385 Lys Pro	Glu Leu Thr A 390	sn Pro Val Va 39!	l Ala Glu Ser Pro	Lys 400
<210> 71 <211> 1179 <212> DNA <213> ospC Chime	era			
<220> <221> CDS <222> (1)(11	79)			
			a gct tta ata gga 1 Ala Leu Ile Gly 15	
			aat aat tca gga S Asn Asn Ser Gly 30	
	Ser Ala Asn S		g tct gtt aaa ggg 1 Ser Val Lys Gly 45	
			a tct aac gca gtt 1 Ser Asn Ala Val 60	
ctg gcc gtg aaa Leu Ala Val Lys 65	gaa gtt gag a Glu Val Glu T 70	cc tta ctt gc hr Leu Leu Ala 7	a tct ata gat gaa a Ser Ile Asp Glu 5	ctt 240 Leu 80
gct acc aaa gct Ala Thr Lys Ala	att ggt aaa a Ile Gly Lys L 85	aa ata ggc aa ys Ile Gly Asi 90	t aat ggt tta gag n Asn Gly Leu Glu 95	gcc 288 Ala
			a gct tat gca ata y Ala Tyr Ala Ile 110	
	Glu Lys Leu A		a aat gaa gaa tta s Asn Glu Glu Leu 125	
			a gaa ttt act aat r Glu Phe Thr Asn 140	
			c aat ctt act gat o Asn Leu Thr Asp	
			a aat aaa gat aag a Asn Lys Asp Lys 175	

		aag Lys						576
		tta Leu						624
		aat Asn						672
		gtt Val 230						720
		aac Asn						768
		ata Ile						816
		agt Ser						864
		tat Tyr						912
		tca Ser 310						960
		gaa Glu						1008
		ggc Gly						1056
		gat Asp						1104
		aaa Lys						1152
		gag Glu 390						1179

<210> 72

#### 88/108

<211> 393 <212> PRT <213> ospC Chimera Met Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ile Gly Cys Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys 20 Asp Gly Asn Ala Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro 40 Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu 70 Ala Thr Lys Ala Ile Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala 90 Asn Gln Ser Lys Asn Thr Ser Leu Leu Ser Gly Ala Tyr Ala Ile Ser 105 Asp Leu Ile Ala Glu Lys Leu Asn Val Leu Lys Asn Glu Glu Leu Lys 120 125 Glu Lys Ile Asp Thr Ala Lys Gln Cys Ser Thr Glu Phe Thr Asn Lys 135 140 Leu Lys Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp 150 155 Asn Ala Gln Arg Ala Ile Leu Lys Lys His Ala Asn Lys Asp Lys Gly 165 170 Ala Ala Glu Leu Glu Lys Leu Phe Lys Ala Val Glu Asn Leu Ser Lys 185 190 Ala Ala Gln Asp Thr Leu Lys Asn Ala Val Lys Glu Leu Thr Ser Pro 200 Ile Val His Gly Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn 215 220 Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys 235 230 Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu 250 Thr Leu Leu Thr Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys 260 265 Ile Lys Asn Asp Val Ser Leu Asp Asn Glu Ala Asp His Asn Gly Ser 280 Leu Ile Ser Gly Ala Tyr Leu Ile Ser Asn Leu Ile Thr Lys Lys Ile 295 300 Ser Ala Ile Lys Asp Ser Gly Glu Leu Lys Ala Glu Ile Glu Lys Ala 315 310 Lys Lys Cys Ser Glu Glu Phe Thr Ala Lys Leu Lys Gly Glu His Thr Asp Leu Gly Lys Glu Gly Val Thr Asp Asp Asn Ala Lys Lys Ala Ile 345 Leu Lys Thr Asn Asn Asp Lys Thr Lys Gly Ala Asp Glu Leu Glu Lys 360 Leu Phe Glu Ser Val Lys Asn Leu Ser Lys Ala Ala Lys Glu Met Leu 375 Thr Asn Ser Val Lys Glu Leu Thr Ser 390

<210 <211 <212 <213	> 11 > DN	178 NA	Chime	era												
<220 <221 <222	> CI		. (117	78)												
<400 atg Met 1	aga	tta	tta Leu	ata Ile 5	gga Gly	ttt Phe	gct Ala	tta Leu	gcg Ala 10	tta Leu	gct Ala	tta Leu	ata Ile	gga Gly 15	tgt Cys	48
gca Ala																96
												gtt Val 45				144
aat Asn	ctt Leu 50	aca Thr	gaa Glu	ata Ile	agt Ser	aaa Lys 55	aaa Lys	att Ile	aca Thr	gaa Glu	tct Ser 60	aac Asn	gca Ala	gtt Val	gtt Val	192
ctg Leu 65	gcc Ala	gtg Val	aaa Lys	gaa Glu	gtt Val 70	gag Glu	acc Thr	tta Leu	ctt Leu	gca Ala 75	tct Ser	ata Ile	gat Asp	gaa Glu	ctt Leu 80	240
gct Ala	acc Thr	aaa Lys	gct Ala	att Ile 85	ggt Gly	aaa Lys	aaa Lys	ata Ile	ggc Gly 90	aat Asn	aat Asn	ggt Gly	tta Leu	gag Glu 95	gcc Ala	288
aat Asn	cag Gln	agt Ser	aaa Lys 100	aac Asn	aca Thr	tca Ser	ttg Leu	tta Leu 105	tca Ser	gga Gly	gct Ala	tat Tyr	gca Ala 110	ata Ile	tct Ser	336
gac Asp	cta Leu	ata Ile 115	gca Ala	gaa Glu	aaa Lys	tta Leu	aat Asn 120	gta Val	ttg Leu	aaa Lys	aat Asn	gaa Glu 125	gaa Glu	tta Leu	aag Lys	384
gaa Glu	aag Lys 130	att Ile	gat Asp	aca Thr	gct Ala	aag Lys 135	caa Gln	tgt Cys	tct Ser	aca Thr	gaa Glu 140	ttt Phe	act Thr	aat Asn	aaa Lys	432
												ctt Leu				480
aat Asn	gca Ala	caa Gln	aga Arg	gct Ala 165	att Ile	tta Leu	aaa Lys	aaa Lys	cat His 170	gca Ala	aat Asn	aaa Lys	gat Asp	aag Lys 175	ggt Gly	528

					aag Lys											576
gca Ala	gct Ala	caa Gln 195	gac Asp	aca Thr	tta Leu	aaa Lys	aat Asn 200	gct Ala	gtt Val	aaa Lys	gag Glu	ctt Leu 205	aca Thr	agt Ser	cct Pro	624
					aat Asn											672
tct Ser 225	gct Ala	gat Asp	gag Glu	tct Ser	gtt Val 230	aaa Lys	ggg Gly	cct Pro	aat Asn	ctt Leu 235	aca Thr	gaa Glu	ata Ile	agt Ser	aaa Lys 240	720
					aac Asn											768
					ata Ile											816
					ggt Gly											864
aca Thr	ttg Leu 290	tta Leu	gca Ala	ggt Gly	gct Ala	tat Tyr 295	aca Thr	ata Ile	tca Ser	aaa Lys	cta Leu 300	ata Ile	aca Thr	caa Gln	aaa Lys	912
tta Leu 305	gat Asp	gga Gly	ttg Leu	aaa Lys	aat Asn 310	tca Ser	gaa Glu	aaa Lys	tta Leu	aag Lys 315	gaa Glu	aaa Lys	att Ile	gaa Glu	aat Asn 320	960
gct Ala	aag Lys	aaa Lys	tgt Cys	tct Ser 325	gaa Glu	gat Asp	ttt Phe	act Thr	aaa Lys 330	aaa Lys	cta Leu	gaa Glu	gga Gly	gaa Glu 335	cat His	1008
					gaa Glu											1056
att Ile	tta Leu	ata Ile 355	aca Thr	gat Asp	gca Ala	gct Ala	aaa Lys 360	gat Asp	aag Lys	ggc Gly	gct Ala	gca Ala 365	gag Glu	ctt Leu	gaa Glu	1104
aag Lys	cta Leu 370	ttt Phe	aaa Lys	gca Ala	gta Val	gaa Glu 375	aac Asn	ttg Leu	gca Ala	aaa Lys	gca Ala 380	gct Ala	aaa Lys	gag Glu	atg Met	1152
					aaa Lys 390											1178

<210> 74

#### 91/108

<211> 392 <212> PRT <213> ospC Chimera <400> 74 Met Arg Leu Ile Gly Phe Ala Leu Ala Leu Ile Gly Cys Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys Asp Gly Asn Ala Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala 90 Asn Gln Ser Lys Asn Thr Ser Leu Leu Ser Gly Ala Tyr Ala Ile Ser 105 Asp Leu Ile Ala Glu Lys Leu Asn Val Leu Lys Asn Glu Glu Leu Lys 120 Glu Lys Ile Asp Thr Ala Lys Gln Cys Ser Thr Glu Phe Thr Asn Lys 135 140 Leu Lys Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp 150 155 Asn Ala Gln Arg Ala Ile Leu Lys Lys His Ala Asn Lys Asp Lys Gly 170 Ala Ala Glu Leu Glu Lys Leu Phe Lys Ala Val Glu Asn Leu Ser Lys 185 Ala Ala Gln Asp Thr Leu Lys Asn Ala Val Lys Glu Leu Thr Ser Pro 200 Ile Val His Gly Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn 215 220 Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys 235 230 Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Ile Glu 245 250 Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys 260 265 Lys Ile Gln Gln Asn Gly Gly Leu Ala Val Glu Ala Gly His Asn Gly 280 Thr Leu Leu Ala Gly Ala Tyr Thr Ile Ser Lys Leu Ile Thr Gln Lys 295 300 Leu Asp Gly Leu Lys Asn Ser Glu Lys Leu Lys Glu Lys Ile Glu Asn 315 310 Ala Lys Lys Cys Ser Glu Asp Phe Thr Lys Lys Leu Glu Gly Glu His 330 325 Ala Gln Leu Gly Ile Glu Asn Val Thr Asp Glu Asn Ala Lys Lys Ala 345 340 Ile Leu Ile Thr Asp Ala Ala Lys Asp Lys Gly Ala Ala Glu Leu Glu 360 Lys Leu Phe Lys Ala Val Glu Asn Leu Ala Lys Ala Ala Lys Glu Met 375 Leu Ala Asn Ser Val Lys Glu Leu

<210> 75 <211> 1178 <212> DNA <213> ospC Chimera			
<220> <221> CDS <222> (1)(1178)			
<400> 75 atg aga tta tta at Met Arg Leu Leu II 1	e Gly Phe Ala		
gca caa aaa ggt gc Ala Gln Lys Gly Al 20			
gat ggg aat gca to Asp Gly Asn Ala Se 35			
aat ctt aca gaa at Asn Leu Thr Glu Il 50			
ctg gcc gtg aaa ga Leu Ala Val Lys Gl 65			
gct acc aaa gct at Ala Thr Lys Ala Il			
aat cag agt aaa aa Asn Gln Ser Lys As 100			
gac cta ata gca ga Asp Leu Ile Ala Gl 115		Val Leu Lys Asn	
gaa aag att gat ac Glu Lys Ile Asp Th 130			
cta aaa agt gaa ca Leu Lys Ser Glu Hi 145			
aat gca caa aga go Asn Ala Gln Arg Al	a Ile Leu Lys		
gct gca gaa ctt ga Ala Ala Glu Leu Gl 180			

					tta Leu											624
					aat Asn											672
					gtt Val 230											720
					aac Asn											768
					ata Ile											816
aaa Lys	ata Ile	ggc Gly 275	aat Asn	aat Asn	ggt Gly	tta Leu	gag Glu 280	gcc Ala	aat Asn	cag Gln	agt Ser	aaa Lys 285	aac Asn	aca Thr	tca Ser	864
ttg Leu	tta Leu 290	tca Ser	gga Gly	gct Ala	tat Tyr	gca Ala 295	ata Ile	tct Ser	gac Asp	cta Leu	ata Ile 300	gca Ala	gaa Glu	aaa Lys	tta Leu	912
aat Asn 305	gta Val	ttg Leu	aaa Lys	aat Asn	gaa Glu 310	gaa Glu	tta Leu	aag Lys	gaa Glu	aag Lys 315	att Ile	gat Asp	aca Thr	gct Ala	aag Lys 320	960
					ttt Phe											1008
ctt Leu	ggt Gly	ctg Leu	gac Asp 340	aat Asn	ctt Leu	act Thr	gat Asp	gat Asp 345	aat Asn	gca Ala	caa Gln	aga Arg	gct Ala 350	att Ile	tta Leu	1056
aaa Lys	aaa Lys	cat His 355	gca Ala	aat Asn	aaa Lys	gat Asp	aag Lys 360	ggt Gly	gct Ala	gca Ala	gaa Glu	ctt Leu 365	gaa Glu	aag Lys	tta Leu	1104
ttt Phe	aaa Lys 370	gcg Ala	gta Val	gaa Glu	aac Asn	tta Leu 375	tca Ser	aaa Lys	gca Ala	gct Ala	caa Gln 380	gac Asp	aca Thr	tta Leu	aaa Lys	1152
					ctt Leu 390			cc								1178

<210> 76

#### 94/108

<211> 392 <212> PRT <213> ospC Chimera <400> 76 Met Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys Asp Gly Asn Ala Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val 55 Leu Ala Val Lys Glu Val Glu Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys Ile Gly Asn Asn Gly Leu Glu Ala Asn Gln Ser Lys Asn Thr Ser Leu Leu Ser Gly Ala Tyr Ala Ile Ser 105 Asp Leu Ile Ala Glu Lys Leu Asn Val Leu Lys Asn Glu Glu Leu Lys 120 Glu Lys Ile Asp Thr Ala Lys Gln Cys Ser Thr Glu Phe Thr Asn Lys 135 Leu Lys Ser Glu His Ala Val Leu Gly Leu Asp Asn Leu Thr Asp Asp 150 155 Asn Ala Gln Arg Ala Ile Leu Lys Lys His Ala Asn Lys Asp Lys Gly 170 Ala Ala Glu Leu Glu Lys Leu Phe Lys Ala Val Glu Asn Leu Ser Lys 185 190 Ala Ala Gln Asp Thr Leu Lys Asn Ala Val Lys Glu Leu Thr Ser Pro 205 200 Ile Val His Gly Asn Asn Ser Arg Lys Asp Gly Asn Ala Ser Thr Asn 215 220 Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys 230 235 Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu 250 Thr Leu Leu Ala Ser Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys 265 Lys Ile Gly Asn Asn Gly Leu Glu Ala Asn Gln Ser Lys Asn Thr Ser 280 Leu Leu Ser Gly Ala Tyr Ala Ile Ser Asp Leu Ile Ala Glu Lys Leu 295 300 Asn Val Leu Lys Asn Glu Glu Leu Lys Glu Lys Ile Asp Thr Ala Lys 310 315 Gln Cys Ser Thr Glu Phe Thr Asn Lys Leu Lys Ser Glu His Ala Val 330 325 Leu Gly Leu Asp Asn Leu Thr Asp Asp Asn Ala Gln Arg Ala Ile Leu 340 345 Lys Lys His Ala Asn Lys Asp Lys Gly Ala Ala Glu Leu Glu Lys Leu 360 365 Phe Lys Ala Val Glu Asn Leu Ser Lys Ala Ala Gln Asp Thr Leu Lys 375 Asn Ala Val Lys Glu Leu Thr Ser 390

<210> 77 <211> 1230 <212> DNA <213> ospC	Chimera										
<220> <221> CDS <222> (1).	(1230)										
<400> 77 atg aga tt Met Arg Le 1											48
gca caa aa Ala Gln Ly	a ggt gct s Gly Ala 20	gag tca Glu Ser	att gga Ile Gly 25	tcc Ser	tgt Cys	aat Asn	aat Asn	tca Ser 30	Gly	aaa Lys	96
gat ggg aa Asp Gly As	t aca tct n Thr Ser 5	gca aat Ala Asn	tct gct Ser Ala 40	gat Asp	gag Glu	tct Ser	gtt Val 45	aaa Lys	ggg ggg	cct Pro	144
aat ctt ac Asn Leu Th 50	a gaa ata r Glu Ile	agt aaa Ser Lys 55	Lys Ile	acg Thr	gat Asp	tct Ser 60	aat Asn	gcg Ala	gtt Val	tta Leu	192
ctt gct gt Leu Ala Va 65	g aaa gag l Lys Glu	gtt gaa Val Glu 70	gcg ttg Ala Leu	ctg Leu	tca Ser 75	tct Ser	ata Ile	gat Asp	gaa Glu	att Ile 80	240
gct gct aa Ala Ala Ly	a gct att s Ala Ile 85	Gly Lys	aaa ata Lys Ile	cac His 90	caa Gln	aat Asn	aat Asn	ggt Gly	ttg Leu 95	gat Asp	288
acc gaa ta Thr Glu Ty	t aat cac r Asn His 100	aat gga Asn Gly	tca ttg Ser Leu 105	Leu	gcg Ala	gga Gly	gct Ala	tat Tyr 110	gca Ala	ata Ile	336
tca acc ct Ser Thr Le	u Ile Lys	caa aaa Gln Lys	tta gat Leu Asp 120	gga Gly	ttg Leu	aaa Lys	aat Asn 125	gaa Glu	gga Gly	tta Leu	384
aag gaa aa Lys Glu Ly 130	a att gat s Ile Asp	gcg gct Ala Ala 135	Lys Lys	tgt Cys	tct Ser	gaa Glu 140	aca Thr	ttt Phe	act Thr	aat Asn	432
aaa tta aa Lys Leu Ly 145											480
gct gat go Ala Asp Al	a aaa gaa a Lys Glu 165	Ala Ile	tta aaa Leu Lys	aca Thr 170	aat Asn	ggt Gly	act Thr	aaa Lys	act Thr 175	aaa Lys	528

	_	_	_		gga Gly				_		_		_	_		576
					atg Met											624
					agt Ser											672
					tct Ser 230											720
					agc Ser											768
					gtt Val											816
					aaa Lys											864
gaa Glu	gca Ala 290	aat Asn	cga Arg	aac Asn	gaa Glu	tca Ser 295	ttg Leu	ata Ile	gca Ala	gga Gly	gct Ala 300	tat Tyr	gaa Glu	ata Ile	tca Ser	912
					aaa Lys 310											960
aaa Lys	aaa Lys	att Ile	aaa Lys	gag Glu 325	gct Ala	aag Lys	gat Asp	tgt Cys	tcc Ser 330	caa Gln	aaa Lys	ttt Phe	act Thr	act Thr 335	aag Lys	1008
cta Leu	aaa Lys	gat Asp	agt Ser 340	cat His	gca Ala	gag Glu	Leu	ggt Gly 345	ata Ile	caa Gln	agc Ser	gtt Val	cag Gln 350	Asp	gat Asp	1056
					att Ile											1104
					gag Glu											1152
					tta Leu 390											1200

gtt gtg gca gaa agt cca aaa acct taa 1230 Val Val Ala Glu Ser Pro Lys Lys Pro \*

<210> 78 <211> 409 <212> PRT <213> ospC Chimera <400> 78 Met Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys 10 Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Ile 70 Ala Ala Lys Ala Ile Gly Lys Lys Ile His Gln Asn Asn Gly Leu Asp 90 Thr Glu Tyr Asn His Asn Gly Ser Leu Leu Ala Gly Ala Tyr Ala Ile 100 105 Ser Thr Leu Ile Lys Gln Lys Leu Asp Gly Leu Lys Asn Glu Gly Leu 120 Lys Glu Lys Ile Asp Ala Ala Lys Lys Cys Ser Glu Thr Phe Thr Asn 135 Lys Leu Lys Glu Lys His Thr Asp Leu Gly Lys Glu Gly Val Thr Asp 150 155 Ala Asp Ala Lys Glu Ala Ile Leu Lys Thr Asn Gly Thr Lys Thr Lys 170 Gly Ala Glu Glu Leu Gly Lys Leu Phe Glu Ser Val Glu Val Leu Ser 180 185 Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr Ser 200 Pro Val Val Ala Glu Ser Pro Lys Lys Pro Phe His Gly Asn Asn Ser 220 215 Gly Gly Asp Ser Ala Ser Thr Asn Pro Asp Glu Ser Ala Lys Gly Pro 230 235 Asn Leu Thr Val Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Phe Leu 250 245 Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Leu 265 260 Ser Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Gly Thr Leu Asp Asn 280 Glu Ala Asn Arg Asn Glu Ser Leu Ile Ala Gly Ala Tyr Glu Ile Ser 300 295 Lys Leu Ile Thr Gln Lys Leu Ser Val Leu Asn Ser Glu Glu Leu Lys 315 310 Lys Lys Ile Lys Glu Ala Lys Asp Cys Ser Gln Lys Phe Thr Thr Lys 325 330 Leu Lys Asp Ser His Ala Glu Leu Gly Ile Gln Ser Val Gln Asp Asp

Asn Ala Lys L	s Ala Ile		His Gly		Asp Lys	Gly
Ala Lys Glu L	u Glu Glu	360 Leu Phe Ly 375	s Ser Leu	365 Glu Ser 380	Leu Ser	Lys
Ala Ala Gln A 385	a Ala Leu. 390		r Val Lys 395		Thr Asn	Pro 400
Val Val Ala G		Lys Lys Pr				100
<210> 79 <211> 1209 <212> DNA <213> ospC Ch	mera					
<220> <221> CDS <222> (1)(	.209)					
<400> 79						L 4.0
atg aga tta t Met Arg Leu L 1	a ata gga eu Ile Gly 5	Phe Ala Le	a gcg tta u Ala Leu 10	gct tta Ala Leu	ata gga Ile Gly 15	Cys
gca caa aaa g Ala Gln Lys G			y Ser Cys			
gat ggg aat a Asp Gly Asn T 35	ca tct gca nr Ser Ala	aat tct gc Asn Ser Al 40	t gat gag a Asp Glu	tct gtt Ser Val 45	aaa ggg Lys Gly	cct 144 Pro
aat ctt aca g Asn Leu Thr G 50						
ctt gct gtg a Leu Ala Val L 65		Glu Ala Le				
gct gct aaa g Ala Ala Lys A	et att ggt la Ile Gly 85	aaa aaa at Lys Lys Il	a cac caa e His Gln 90	aat aat Asn Asn	ggt ttg Gly Leu 95	gat 288 Asp
acc gaa tat a Thr Glu Tyr A 1			u Leu Ala			
tca acc cta a Ser Thr Leu I 115						
aag gaa aaa a Lys Glu Lys I 130	t gat gcg le Asp Ala	gct aag aa Ala Lys Ly 135	a tgt tct s Cys Ser	gaa aca Glu Thr 140	ttt act Phe Thr	aat 432 Asn
aaa tta aaa g	aa aaa cac	: aca gat ct	t ggt aaa	gaa ggt	gtt act	gat 480

Lys 145	Leu	Lys	Glu	Lys	His 150	Thr	Asp	Leu	Gly	Lys 155	Glu	Gly	Val	Thr	Asp 160	
-	-	_		-	gcc Ala											528
					gga Gly											576
					atg Met											624
					agt Ser											672
					aca Thr 230											720
					gaa Glu											768
					aaa Lys											816
					att Ile											864
gat Asp	aat Asn 290	gag Glu	gca Ala	gat Asp	cac His	aac Asn 295	gga Gly	tca Ser	tta Leu	ata Ile	tca Ser 300	gga Gly	gca Ala	tat Tyr	tta Leu	912
					aca Thr 310											960
					att Ile											1008
					ggt Gly											1056
act Thr	gat Asp	gat Asp 355	aat Asn	gca Ala	aaa Lys	aaa Lys	gcc Ala 360	att Ile	tta Leu	aaa Lys	aca Thr	aat Asn 365	aat Asn	gat Asp	aaa Lys	1104

ttg tca aaa gca gct aaa gag atg ctt act aat tca gtt aaa gag ctt	.200
Leu Ser Lys Ala Ala Lys Glu Met Leu Thr Asn Ser Val Lys Glu Leu 385 390 395 400	
aca agc taa Thr Ser *	.209
<210> 80 <211> 402 <212> PRT <213> ospC Chimera	
<400> 80	
Met Arg Leu Leu Ile Gly Phe Ala Leu Ala Leu Ala Leu Ile Gly Cys 1 10 15	
Ala Gln Lys Gly Ala Glu Ser Ile Gly Ser Cys Asn Asn Ser Gly Lys 20 25 30	
Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro 35 40 45	
Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Val Leu 50 55 60	
Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp Glu Ile 65 70 75 80	
Ala Ala Lys Ala Ile Gly Lys Lys Ile His Gln Asn Asn Gly Leu Asp 85 90 95	
Thr Glu Tyr Asn His Asn Gly Ser Leu Leu Ala Gly Ala Tyr Ala Ile 100 105 110	
Ser Thr Leu Ile Lys Gln Lys Leu Asp Gly Leu Lys Asn Glu Gly Leu 115 120 125	
Lys Glu Lys Ile Asp Ala Ala Lys Lys Cys Ser Glu Thr Phe Thr Asn 130 135 140	
Lys Leu Lys Glu Lys His Thr Asp Leu Gly Lys Glu Gly Val Thr Asp	
145 150 155 160  Ala Asp Ala Lys Glu Ala Ile Leu Lys Thr Asn Gly Thr Lys Thr Lys	
165 170 175  Gly Ala Glu Glu Leu Gly Lys Leu Phe Glu Ser Val Glu Val Leu Ser	
180 185 190  Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val Lys Glu Leu Thr Ser	
195 200 205 Pro Val Val Ala Glu Ser Pro Lys Lys Pro Ser Met Val Asn Asn Ser	
210 215 220 Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys 225 230 235 240	
Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala	
245 250 255  Val Val Leu Ala Val Lys Glu Val Glu Thr Leu Leu Thr Ser Ile Asp	
260 265 270  Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Val Ser Leu	
275 280 285 Asp Asn Glu Ala Asp His Asn Gly Ser Leu Ile Ser Gly Ala Tyr Leu 290 295 300	

Ile 305	Ser	Asn	Leu	Ile	Thr 310	Lys	Lys	Ile	Ser	Ala 315	Ile	Lys	Asp	Ser	Gly 320	
	Leu	Lys	Ala	Glu 325		Glu	Lys	Ala	Lys 330		Cys	Ser	Glu	Glu 335		
Thr	Ala	Lys	Leu 340	Lys	Gly	Glu	His	Thr 345		Leu	Gly	Lys	Glu 350		Val	
Thr	Asp	Asp 355		Ala	Lys	Lys	Ala 360		Leu	Lys	Thr	Asn 365		Asp	Lys	
Thr	Lys 370		Ala	Asp	Glu	Leu 375		Lys	Leu	Phe	Glu 380		Val	Lys	Asn	
Leu 385 Thr	Ser	Lys	Ala	Ala	Lys 390		Met	Leu	Thr	Asn 395		Val	Lys	Glu	Leu 400	
<212 <212	0> 81 l> 12 2> DN 3> os	205	Chime	era												
	L> CI	os L)	. (12	05)												
	)> 81		++~	ata	~~~	+++	act	++>	aca	++>	act	t+ >	2+2	aas	tat	48
				Ile 5												40
gca Ala	caa Gln	aaa Lys	ggt Gly 20	gct Ala	gag Glu	tca Ser	att Ile	gga Gly 25	tcc Ser	tgt Cys	aat Asn	aat Asn	tca Ser 30	ggg Gly	aaa Lys	96
gat Asp	ggg Gly	aat Asn 35	aca Thr	tct Ser	gca Ala	aat Asn	tct Ser 40	gct Ala	gat Asp	gag Glu	tct Ser	gtt Val 45	aaa Lys	ggg Gly	cct Pro	144
aat Asn	ctt Leu 50	aca Thr	gaa Glu	ata Ile	agt Ser	aaa Lys 55	aaa Lys	att Ile	acg Thr	gat Asp	tct Ser 60	aat Asn	gcg Ala	gtt Val	tta Leu	192
ctt Leu 65	gct Ala	gtg Val	aaa Lys	gag Glu	gtt Val 70	gaa Glu	gcg Ala	ttg Leu	ctg Leu	tca Ser 75	tct Ser	ata Ile	gat Asp	gaa Glu	att Ile 80	240
gct Ala	gct Ala	aaa Lys	gct Ala	att Ile 85	ggt Gly	aaa Lys	aaa Lys	ata Ile	cac His 90	caa Gln	aat Asn	aat Asn	ggt Gly	ttg Leu 95	gat Asp	288
acc Thr	gaa Glu	tat Tyr	aat Asn 100	cac His	aat Asn	gga Gly	tca Ser	ttg Leu 105	tta Leu	gcg Ala	gga Gly	gct Ala	tat Tyr 110	gca Ala	ata Ile	336
tca Ser	acc Thr	cta Leu 115	ata	aaa Lys	caa Gln	aaa Lys	tta Leu 120	gat	gga Gly	ttg Leu	aaa Lys	aat Asn 125	gaa Glu	gga Gly	tta Leu	384

														act Thr		432
														act Thr		480
														act Thr 175		528
														ttg Leu		576
aaa Lys	gca Ala	gct Ala 195	aaa Lys	gag Glu	atg Met	ctt Leu	gct Ala 200	aat Asn	tca Ser	gtt Val	aaa Lys	gag Glu 205	ctt Leu	aca Thr	agc Ser	624
														aat Asn		672
														gtt Val		720
														aac Asn 255		768
														ata Ile		816
gaa Glu	ctt Leu	gct Ala 275	act Thr	aaa Lys	gct Ala	att Ile	ggt Gly 280	aaa Lys	aaa Lys	ata Ile	caa Gln	caa Gln 285	aat Asn	ggt Gly	ggt Gly	864
Leu	gct Ala 290	Val	Glu	Ala	ggg Gly	His	Asn	Gly	Thr	Leu	Leu	Ala	ggt Gly	gct Ala	tat Tyr	912
aca Thr 305	ata Ile	tca Ser	aaa Lys	cta Leu	ata Ile 310	aca Thr	caa Gln	aaa Lys	tta Leu	gat Asp 315	gga Gly	ttg Leu	aaa Lys	aat Asn	tca Ser 320	960
														gaa Glu 335		1008
ttt Phe	act Thr	aaa Lys	aaa Lys 340	cta Leu	gaa Glu	gga Gly	gaa Glu	cat His 345	gcg Ala	caa Gln	ctt Leu	gga Gly	att Ile 350	gaa Glu	aat Asn	1056

					gca Ala											1104
					gca Ala											1152
					gct Ala 390											1200
ctt Leu	ac															1205
<211 <212	)> 82 L> 40 2> PF 3> os	)1 RT	Chime	era												
	)> 82 Arg		Leu	Ile 5	Gly	Phe	Ala	Leu	Ala 10	Leu	Ala	Leu	Ile	Gly 15	Cys	
	Gln	Lys	Gly 20	_	Glu	Ser	Ile	Gly 25		Cys	Asn	Asn	Ser 30		Lys	
Asp	Gly	Asn 35		Ser	Ala	Asn	Ser 40		Asp	Glu	Ser	Val 45	-	Gly	Pro	
Asn	Leu 50		Glu	Ile	Ser	Lys 55	Lys	Ile	Thr	Asp	Ser 60	Asn	Ala	Val	Leu	
Leu 65	Ala	Val	Lys	Glu	Val 70	Glu	Ala	Leu	Leu	Ser 75	Ser	Ile	Asp	Glu	Ile 80	
	Ala	Lys	Ala	Ile 85	Gly	Lys	Lys	Ile	His 90	Gln	Asn	Asn	Gly	Leu 95	Asp	
Thr	Glu	Tyr	Asn 100	His	Asn	Gly	Ser	Leu 105	Leu	Ala	Gly	Ala	Tyr 110	Ala	Ile	
Ser	Thr	Leu 115	Ile	Lys	Gln	Lys	Leu 120	Asp	Gly	Leu	Lys	Asn 125	Glu	Gly	Leu	
Lys	Glu 130	Lys	Ile	Asp	Ala	Ala 135	Lys	Lys	Cys	Ser	Glu 140	Thr	Phe	Thr	Asn	
145					His 150					155					160	
Ala	Asp	Ala	Lys	Glu 165	Ala	Ile	Leu	Lys	Thr 170	Asn	Gly	Thr	Lys	Thr 175	Lys	
Gly	Ala	Glu	Glu 180	Leu	Gly	Lys	Leu	Phe 185	Glu	Ser	Val	Glu	Val 190	Leu	Ser	
Lys	Ala	Ala 195	Lys	Glu	Met	Leu	Ala 200	Asn	Ser	Val	Lys	Glu 205	Leu	Thr	Ser	
Pro	Val 210	Val	Ala	Glu	Ser	Pro 215	Lys	Lys	Pro	Ser	Met 220	Val	Asn	Asn	Ser	
225	_	_			Thr 230					235					240	
				245	Glu				250					255		
Val	Val	Leu	Ala 260	Val	Lys	Glu	Ile	Glu 265	Thr	Leu	Leu	Ala	Ser 270	Ile	Asp	

Glu Leu Ala 275	Thr Lys	Ala I	le Gly 280	Lys	Lys	Ile	Gln	Gln 285	Asn	Gly	Gly	
Leu Ala Val 290	Glu Ala	_		Gly	Thr	Leu	Leu 300		Gly	Ala	Tyr	
Thr Ile Ser	Lys Leu	Ile TI	nr Gln	Lys	Leu	Asp 315	Gly	Leu	Lys	Asn	Ser 320	
Glu Lys Leu	_		le Glu	Asn			Lys	Cys	Ser			
Phe Thr Lys	325 Lys Leu 340	Glu G	ly Glu	His 345	330 Ala	Gln	Leu	Gly	Ile 350	335 Glu	Asn	
Val Thr Asp 355	Glu Asn	Ala L	ys Lys 360		Ile	Leu	Ile	Thr 365		Ala	Ala	
Lys Asp Lys 370	Gly Ala			Glu	Lys	Leu	Phe 380		Ala	Val	Glu	
Asn Leu Ala 385 Leu	Lys Ala			Met	Leu	Ala 395		Ser	Val	Lys	Glu 400	
<210> 83 <211> 1236 <212> DNA <213> ospC	Chimera											
<220> <221> CDS <222> (1)	. (1236)											
<400> 83		,						<b></b> .	_ + _		<b>.</b>	4.0
atg aga tta Met Arg Leu 1												48
gca caa aaa Ala Gln Lys												96
ggt ggg gat Gly Gly Asp 35												144
cct aat ctt Pro Asn Leu 50		Ile S										192
gta ctt gct Val Leu Ala 65												240
ctt gct aag		att o	gt caa	aaa	ata	gac	aat	aat	aat	ggt		288
Leu Ala Lys						Asp	Asn	Asn	Asn	Gly 95	Leu	

														tta Leu		384
														gaa Glu		432
														gat Asp		480
														act Thr 175		528
														gaa Glu		576
														gaa Glu		624
aca Thr	agt Ser 210	cct Pro	gtt Val	gta Val	gca Ala	gaa Glu 215	agt Ser	cca Pro	aaa Lys	aaa Lys	cct Pro. 220	cat His	atg Met	gct Ala	aat Asn	672
aat Asn 225	tca Ser	ggt Gly	ggg Gly	gat Asp	tct Ser 230	gca Ala	tct Ser	act Thr	aat Asn	cct Pro 235	gat Asp	gag Glu	tct Ser	gca Ala	aaa Lys 240	720
gga Gly	cct Pro	aat Asn	ctt Leu	acc Thr 245	gta Val	ata Ile	agc Ser	aaa Lys	aaa Lys 250	att Ile	aca Thr	gat Asp	tct Ser	aat Asn 255	gca Ala	768
ttt Phe	tta Leu	ctg Leu	gct Ala 260	gtg Val	aaa Lys	gaa Glu	gtt Val	gag Glu 265	gct Ala	ttg Leu	ctt Leu	tca Ser	tct Ser 270	ata Ile	gat Asp	816
gaa Glu	ctt Leu	tct Ser 275	aaa Lys	gct Ala	att Ile	ggt Gly	aaa Lys 280	aaa Lys	ata Ile	aaa Lys	aat Asn	gat Asp 285	ggt Gly	act Thr	tta Leu	864
gat Asp	aac Asn 290	gaa Glu	gca Ala	aat Asn	cga Arg	aac Asn 295	gaa Glu	tca Ser	ttg Leu	ata Ile	gca Ala 300	gga Gly	gct Ala	tat Tyr	gaa Glu	912
ata Ile 305	tca Ser	aaa Lys	cta Leu	ata Ile	aca Thr 310	caa Gln	aaa Lys	tta Leu	agt Ser	gta Val 315	ttg Leu	aat Asn	tca Ser	gaa Glu	gaa Glu 320	960
														ttt Phe 335		1008
act	aag	cta	aaa	gat	agt	cat	gca	gag	ctt	ggt	ata	caa	agc	gtt	cag	1056

Thr	Lys	Leu	Lys 340	Asp	Ser	His	Ala	Glu 345	Leu	Gly	Ile	Gln	Ser 350	Val	Gln	
					aaa Lys											1104
					ctt Leu											1152
					gca Ala 390											1200
					gaa Glu						taa *					1236
<210> 84 <211> 411 <212> PRT <213> ospC Chimera																
<400> 84																
			Leu	Ile 5	Gly	Phe	Ala	Leu	Ala 10	Leu	Ala	Leu	Ile	Gly 15	Cys	
	Gln	Lys	Gly 20		Glu	Ser	Ile	Gly 25		Cys	Ser	Asn	Ser 30		Lys	
Gly	Gly	Asp 35		Ala	Ser	Thr	Asn 40		Ala	Asp	Glu	Ser 45	Ala	Lys	Gly	
Pro	Asn 50		Thr	Glu	Ile	Ser 55		Lys	Ile	Thr	Asp 60	Ser	Asn	Ala	Phe	
Val 65		Ala	Val	Lys	Glu 70		Glu	Thr	Leu	Val 75	Leu	Ser	Ile	Asp	Glu 80	
Leu	Ala	Lys	Lys	Ala 85	Ile	Gly	Gln	Lys	Ile 90		Asn	Asn	Asn	Gly 95	Leu	
Ala	Ala	Leu	Asn 100		Gln	Asn	Gly	Ser 105	Leu	Leu	Ala	Gly	Ala 110	Tyr	Ala	
Ile		Thr 115	Leu		Thr			Leu				Lys 125	Asn	Leu	Glu	
Glu	Leu 130	Lys	Thr	Glu	Ile	Ala 135	Lys	Ala	Lys	Lys	Cys 140	Ser	Glu	Glu	Phe	
Thr 145		Lys	Leu	Lys	Ser 150	Gly	His	Ala	Asp	Leu 155	Gly	Lys	Gln	Asp	Ala 160	
Thr	Asp	Asp	His	Ala 165	Lys	Ala	Ala	Ile	Leu 170	Lys	Thr	His	Ala	Thr 175		
Asp	Lys	Gly	Ala 180		Glu	Phe	Lys	Asp 185		Phe	Glu	Ser	Val 190			
Leu	Leu	Lys 195		Ala	Gln	Val	Ala 200	Leu	Thr	Asn	Ser	Val 205		Glu	Leu	
Thr	Ser 210		Val	Val	Ala	Glu 215			Lys	Lys	Pro 220			Ala	Asn	
Asn 225		Gly	Gly	Asp	Ser 230	Ala	Ser	Thr	Asn	Pro 235		Glu	Ser	Ala	Lys 240	

Gly Pro Asn Leu Thr Val Ile Ser Lys Lys Ile Thr Asp Ser Asn Ala Phe Leu Leu Ala Val Lys Glu Val Glu Ala Leu Leu Ser Ser Ile Asp 265 Glu Leu Ser Lys Ala Ile Gly Lys Lys Ile Lys Asn Asp Gly Thr Leu 280 Asp Asn Glu Ala Asn Arg Asn Glu Ser Leu Ile Ala Gly Ala Tyr Glu 295 300 Ile Ser Lys Leu Ile Thr Gln Lys Leu Ser Val Leu Asn Ser Glu Glu 310 315 Leu Lys Lys Ile Lys Glu Ala Lys Asp Cys Ser Gln Lys Phe Thr 330 Thr Lys Leu Lys Asp Ser His Ala Glu Leu Gly Ile Gln Ser Val Gln 345 Asp Asp Asn Ala Lys Lys Ala Ile Leu Lys Thr His Gly Thr Lys Asp 360 365 Lys Gly Ala Lys Glu Leu Glu Glu Leu Phe Lys Ser Leu Glu Ser Leu 375 380 Ser Lys Ala Ala Gln Ala Ala Leu Thr Asn Ser Val Lys Glu Leu Thr 390 395 Asn Pro Val Val Ala Glu Ser Pro Lys Lys Pro 405

<210> 85 <211> 192 <212> PRT

<213> borrelia burgdorferi

<400> 85 Cys Asn Asn Ser Gly Lys Asp Gly Asn Thr Ser Ala Asn Ser Ala Asp 10 Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Val Glu Thr Leu Leu 40 Thr Ser Ile Asp Glu Leu Ala Lys Ala Ile Gly Lys Lys Ile Lys Asn 55 Asp Val Ser Leu Asp Asn Glu Ala Asp His Asn Gly Ser Leu Ile Ser 70 Gly Ala Tyr Leu Ile Ser Thr Leu Ile Thr Lys Lys Ile Ser Ala Ile 85 90 Lys Asp Ser Gly Glu Leu Lys Ala Glu Ile Glu Lys Ala Lys Lys Cys 100 105 Ser Glu Glu Phe Thr Ala Lys Leu Lys Gly Glu His Thr Asp Leu Gly 115 120 Lys Glu Gly Val Thr Asp Asp Asn Ala Lys Lys Ala Ile Leu Lys Thr 140 135 Asn Asn Asp Lys Thr Lys Gly Ala Asp Glu Leu Glu Lys Leu Phe Glu 155 150 Ser Val Lys Asn Leu Ser Lys Ala Ala Lys Glu Met Leu Thr Asn Ser 170 165 Val Lys Glu Leu Thr Ser Pro Val Val Ala Glu Ser Pro Lys Lys Pro 185

<210> 86 <211> 191 <212> PRT <213> borrelia burgdorferi <400> 86 Asn Ser Gly Lys Gly Gly Asn Thr Ser Ala Asn Ser Ala Asp Glu Ser Val Lys Gly Pro Asn Leu Thr Glu Ile Ser Lys Lys Ile Thr Glu Ser Asn Ala Val Val Leu Ala Val Lys Glu Ile Glu Thr Leu Leu Ala Ser 40 Ile Asp Glu Leu Ala Thr Lys Ala Ile Gly Lys Lys Ile Gln Gln Asn 55 Gly Gly Leu Ala Val Glu Ala Gly His Asn Gly Thr Leu Leu Ala Gly 70 Ala Tyr Thr Ile Ser Lys Leu Ile Thr Gln Lys Leu Asp Gly Leu Lys 90 Asn Ser Glu Lys Leu Lys Glu Lys Ile Glu Asn Ala Lys Lys Cys Ser 105 Glu Asp Phe Thr Lys Lys Leu Glu Gly Glu His Ala Gln Leu Gly Ile 120 Glu Asn Val Thr Asp Glu Asn Ala Lys Lys Ala Ile Leu Ile Thr Asp 135 140 Ala Ala Lys Asp Lys Gly Ala Ala Glu Leu Glu Lys Leu Phe Lys Ala 150 155 Val Glu Asn Leu Ala Lys Ala Ala Lys Glu Met Leu Ala Asn Ser Val 165 170 Lys Glu Leu Thr Ser Pro Ile Val Ala Glu Ser Pro Lys Lys Pro 180 185